

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

- Feb. 16 ... Lecture, "Aerial Manœuvres and Stability," by Prof. L. Bairstow, before Cambridge University Aë.S.
- Feb. 17 ... Lecture, "The Handley Page Wing," by F. Handley Page, before R.Aë.S.
- Feb. 20-22 Aero Club of France Grand Prix. 1st stage
- Feb. 23 ... Lecture, "Possible Developments in Aircraft Engines," by Lieut.-Col. H. T. Tizard, before Cambridge University Aë.S.
- Mar. 3 ... Lecture, "Airship Fabrics," by J. W. W. Dyer, before R.Aë.S.
- Mar. 3 ... Lecture, "Parachutes," by Maj. T. Orde-Lees, before R.Aë.S.
- Mar. 9 ... Lecture, "The Artificial Control of Weather," by Sir Napier Shaw, before Cambridge University Aë.S.
- Mar. 17 ... Lecture, "Flying Boat Construction," by Capt. D. Nicholson, before R.Aë.S.
- Mar. 20-22 Aero Club of France Grand Prix. 2nd stage
- April 13-20 Monaco Seaplane Meeting
- April 20-22 Aero Club of France Grand Prix. 3rd stage
- June 1 ... Entries Close for Schneider Cup
- June 10 ... Race, Lugo-Trieste-Triente-Lugo
- Sept. 5 ... Pulitzer Trophy, Detroit, U.S.A.
- Sept. 30 ... Provisional Date for Schneider Cup

INDEX AND TITLE PAGE FOR VOL. XII. The 8-page Index for Vol. XII of "FLIGHT" (January to December, 1920) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1/- per copy, post free.

EDITORIAL COMMENT



CONSIDERABLE commotion was caused the other day by the announcement made by *The Times* that the Air Ministry has decided to extinguish the airship side of the R.A.F., close down the station at Howden, and to transfer all material, in the shape of airships and equipment, to the control of the Civil Aviation Department. As no denial has been issued from official sources—and particularly as collateral evidence seems to confirm the announcement—we must take it that such a decision has actually been arrived at.

The question which now has to be answered is what is to become of the airship branch, and will the funds available for civil aviation permit the use and development of this side of flying? Answering the last part of the question first, it is perfectly clear that the present finances of the Department will not admit of the spending of enough money to give things a chance. Nor can we discern in the Government policy towards aviation generally much disposition to increase the grants to development. Indeed, the more the matter is studied the less likely does it seem to be that anything is to be hoped for from the State. The reason given for the drastic change of policy which is apparently to take effect is economy—that the nation cannot afford to maintain the airship service—in the long run about as false a piece of economy as it is possible to conceive. So we are faced with the problem of discovering an alternative to scrapping the airships we have, cutting out anything in the shape of a building programme, and sitting idly by while Germany perfects her plans for capturing the long-distance aerial routes of the world. This last is exactly what will happen if we do not take advantage of the present opportunity. Were it not for that we could view the matter with more complacency,

The
Future
of
Airships

but knowing as we do that Germany is only awaiting the right moment to begin, we cannot but regard the future with profound misgiving. We agree that, speaking generally, the need is all for economy, but there are other services, other departments, which can be better done without than the Air Service, civil or military, and if the pruning-knife is to be applied—as we agree it must—then it should be laid to such superfluous departments as the Ministry of Transport, which nobody wants, and which is nothing but a refuge for Geddesian protégés, before it is used upon essential services.

A Constructive Plan

The first part of the question we have asked now falls to be answered. What is to be done with the airships? In all, we possess five rigids completed, now that "R.34" has had to be written off as a complete loss, while there are two—"R.36" and "R.37"—building and nearing completion. This total includes the two surrendered Zeppelins, "L.67" and "L.71." On an average, these ships have cost considerably more than a quarter of a million each. If we estimate that the seven represent more than two millions sterling in value we shall be under rather than over the mark. Obviously, it would be the antipodes of economy to allow these vessels to rot in their sheds, or to break them up for the sake of the scrap material. Nor do we desire to see them disposed of to a foreign Power to enable a rival to get ahead of us in the realm of airship services. Unless we can find some way out, one of the three alternatives suggested must be taken.

It is common knowledge that negotiations were at one time proceeding between the Air Ministry and certain commercial interests for the disposal of the airships and their use on passenger services. Why these negotiations broke down does not particularly matter now. On the one hand, we are told that the attitude of the Government was one of *non possumus*, while, on the other, it is said that the commercial group was too exacting in its demands upon the Government. However all this may be, it must be allowed to become past history and a sincere effort made to come to some arrangement whereby these seven ships—or at any rate the six more modern vessels—can be put into commercial service and this country given a lead in the domain of the lighter-than-air craft.

A distinguished airship officer, now retired from the Service, outlined to us the other day his own scheme for doing this and a very admirable one it seemed. Briefly, he suggests that the six modern craft should be turned over to a commercial group without initial payment, the condition being that they should be actually put into service. This group should consist partly at least of shipping interests, because it is obvious that for the first few years at any rate airships will have to be run on the long-distance overseas routes in conjunction with, and not in competition against, the mail steamships. The reasons for this are sufficiently plain. Another condition would be that, as the ships became obsolete, or beyond further useful service, they should be replaced by up-to-date craft at the expense of the groups running the services. At all times the ships should be at the practically instant call of the Government for conversion to War vessels in case of emergency.

The Government should provide aerodromes,

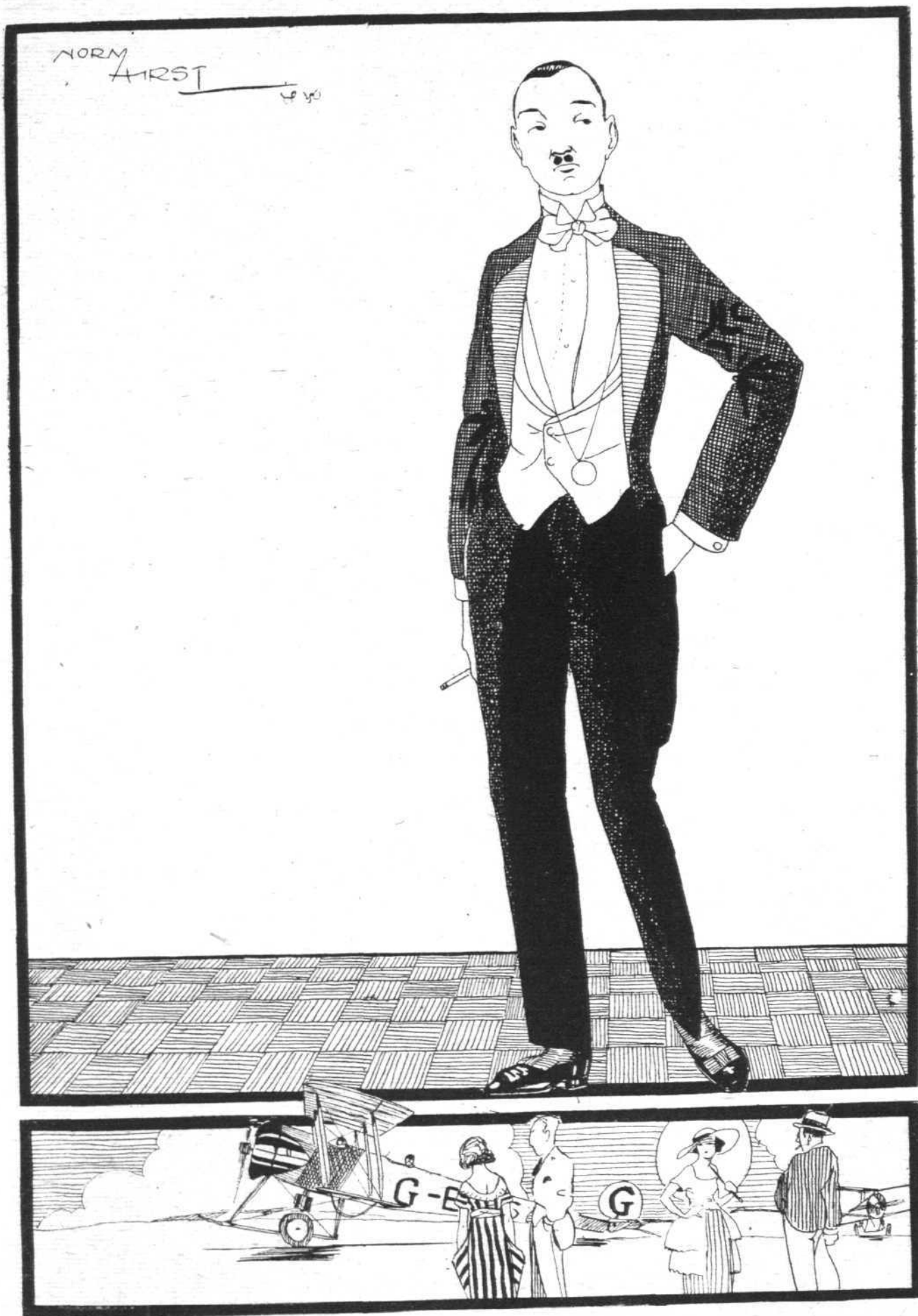
sheds and mooring facilities and would supply fuel, gas and other supplies at a fair margin over actual cost, so that there would be no charge upon the taxpayer on this account. Under this outlined scheme services could be started from this country to Egypt, India and across the Atlantic almost at once. Later on, as the airship proved its reliability and success as a means of transport, the Dominions would be asked to provide the same facilities as the Home Government, *i.e.*, landing grounds, mooring facilities and supplies; and thus there would gradually be built up a world-wide network of services—always, of course, assuming that our faith in the airship is not misplaced.

We are strongly of opinion that here is at least the nucleus of a really workable, practical scheme of services—one that merits the very closest examination and full consideration. The alternative to the adoption of some such plan is to see Germany going ahead by leaps and bounds, until in ten, or it may be fifteen, years' time we shall be faced with the problem of trying to overtake all the leeway we have made in the interval. What that means in trouble and expense we learnt too well in the War to have any desire to undergo a similar experience again.

Subsidies to Civil Aviation

The French Government is rearranging the basis of the subsidies granted to firms engaged in operating aerial transport services, so that these firms are already talking Paris-London fares to £5. Hitherto, these subsidies have been given for actual mileage flown, a method which is obviously open to abuse in that it enables firms to fly empty machines for the dual purpose of advertising their services and of drawing the subsidy. The British method is better, based as it is on a grant of 25 per cent. of the gross takings, and it is some such plan that France now proposes to substitute for the old system. It is a matter of very serious concern, however, to see exactly what it is that France is proposing to do in the air. The Budget recently presented to Parliament provides for Air Estimates of no less than 527,354,645 francs, approximately £21,000,000 at normal rate of exchange. Of this no less a sum than a normal £7,000,000 is to be devoted to the civil side of the movement, and of this over £1,250,000 figures under the heading of "Prizes and Subventions for Aerial Navigation." Our own Air Estimates for the current financial year provided for the spending on civil aviation of roughly £900,000, of which about a third has been "saved!"

We are not going to advocate that an Air Budget of similar proportions should be adopted for this country. How much money we should spend and in what manner it should be spent are matters which require considerable thought and a close knowledge of all the factors governing the aerial situation now and also the probabilities of the immediate future. But we can at least extract this argument from these very significant figures of the French Air Estimates: that either France wildly over-estimates the importance of air power and the possibilities of civil aviation, or that we in this country have gone absolutely to the other extreme and are hopelessly under-valuing the whole business. Nor is there any need to ask for a precise answer to the question involved. We may be content for the moment to assume that the truth of the matter



Aviatic Types—Civil and Otherwise

THE PALAIS DE DANSE

lies somewhere between the two ends of the proposition. Either way we take it, it seems perfectly clear that our own policy is badly wanting in prevision, while to say that the policy of the Government in relation to civil aviation is wanting in generosity is simply to make a burlesque statement of which is nevertheless a fact.

Here we have our very good friend and ally, France, making provision to go ahead at a pace which will very shortly give her an unchallengeable lead in air power, both military and civil. She has a perfect right to follow out whatever policy seems best to her. She would be foolish, with the Hun at her gates, to do anything else but place herself in a position from which she can view with complacency the hopes of revenge which we know are cherished on the other side of the Rhine. Further, if France sees far enough to be able to appreciate the possibilities of the new transport and to realise that in a strong

civil side of the aerial movement lies the best guarantee of superiority in time of war, she would be acting against her own interests did she not spend money now on securing the lead she means to have in the future. But while she is doing this, we see at home the sordid spectacle of an Air Ministry being used as a pawn in the political game of place-seeking. We see the civil side of the movement being starved to death and an industry which did more than any other to win the War being allowed to die of inanition. The airship branch of the Service is being wiped out and nobody knows what is to become of its *personnel* and material. Economy in this essential direction, in which we should be making up our minds to *spend* money, is the order of the day, so that the Government may have huge sums to spend upon vote-catching schemes of "social reform" which lead us nowhere except along the road to bankruptcy.

AERONAUTICAL RESEARCH COMMITTEE REPORTS

Further Reports of the Advisory Committee for Aeronautics Published by H.M. Stationery Office.

INTERNAL-COMBUSTION ENGINE SUB-COMMITTEE REPORTS.

45. Effective Inductance, Effective Resistance and Self-Capacity of Magneto Windings. (With Diagrams.) November, 1919. Price 1s. 3d.

REPORTS AND MEMORANDA.

537. A Flight in Rigid Airship "R. 26." (With Diagrams.) May, 1918. Price 6d.

570. Calculation of the Periods and Damping Factors of Aeroplane Oscillations, and a Comparison, with Observations. (With Diagrams.) February, 1919. Price 9d.

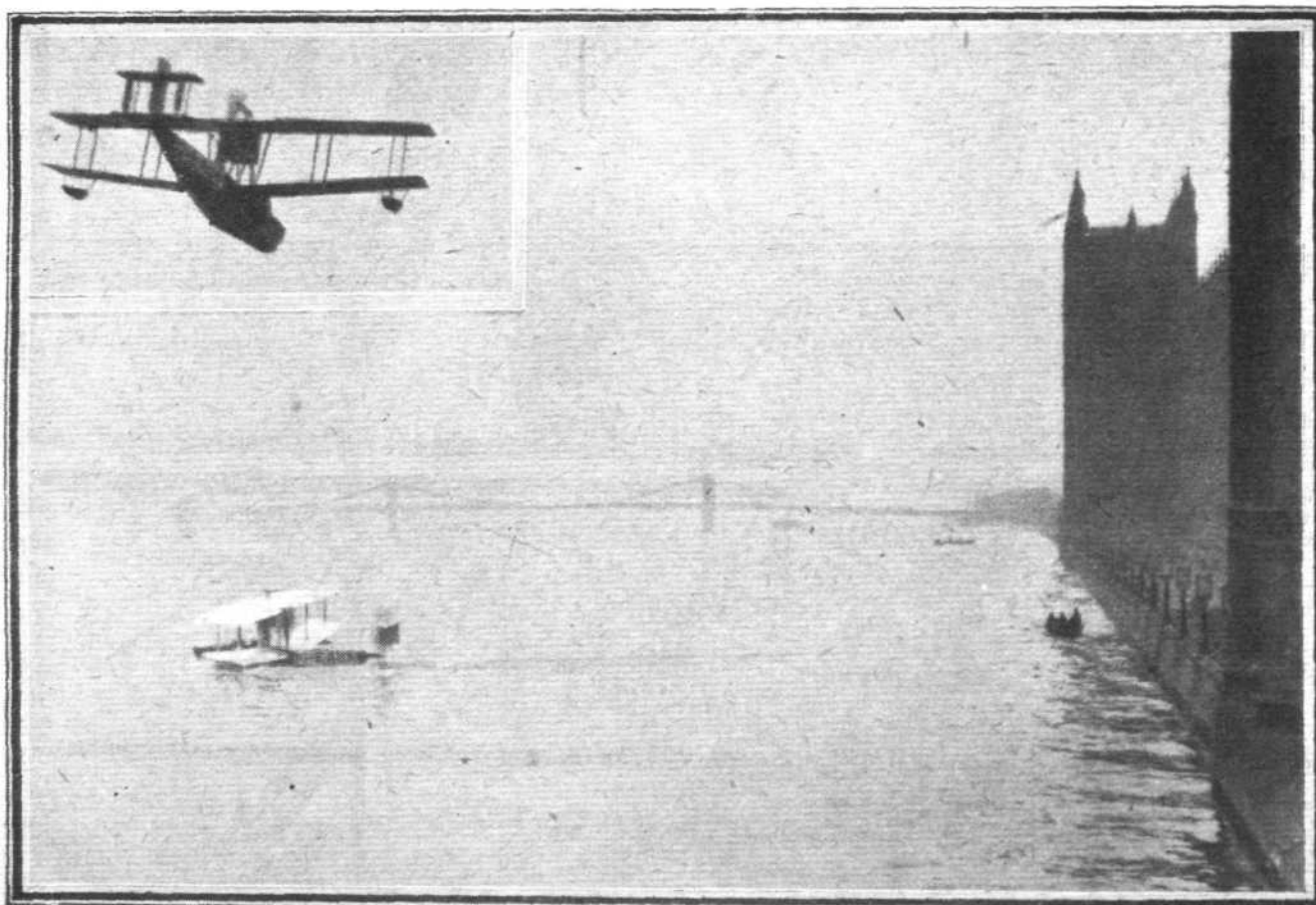
663. Viscosity of some Cellulose Acetate Solutions. (With Diagrams.) November, 1919. Price 3d.

672. Measurement of Static Pressure, Some Experiments on. (With Diagrams.) Price 6d.

A "VIKING" AT WESTMINSTER

On Tuesday of this week, at three o'clock, to the tick, of Big Ben, Capt. Cockerell arrived according to schedule on a Vickers "Viking," 450 h.p. Napier "Lion" engine, from Brooklands, and after cruising around in the mist made a perfect landing on the river in front of the Houses of Parliament. Taking off again, he made another circle, and alighted a second time, and finally got off and returned to Brooklands. By this fine flight, made in very bad misty

weather, Capt. Cockerell demonstrated the feasibility of running passenger services from the heart of great cities fortunate enough to have a river, without the waste of time entailed in getting to and from an aerodrome. The inset photograph shows the "Viking" gliding down over Westminster Bridge to alight, and the main picture shows it taxiing in front of the Houses of Parliament. An illustrated description of this amphibian appeared in *FLIGHT*, Sept. 23 last



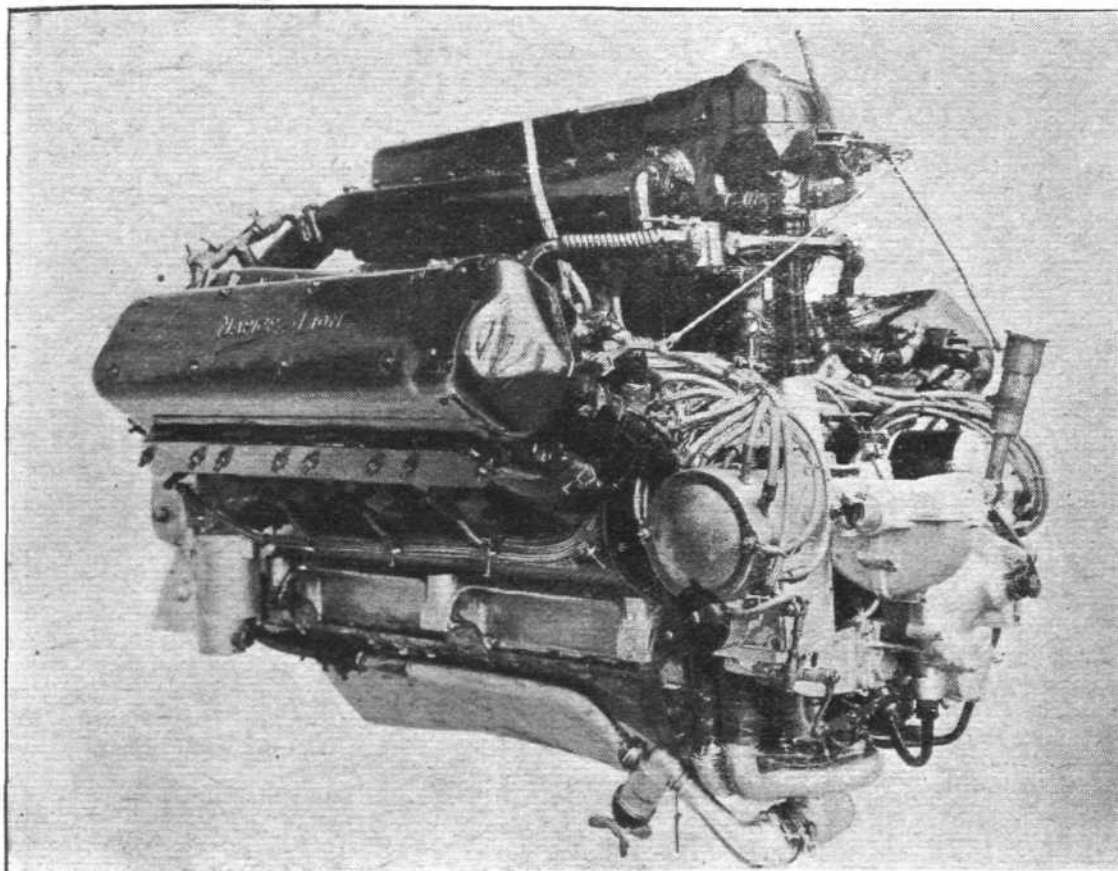
The Vickers "Viking" on the Thames

"Flight" Copyright

SOME NEW NAPIER "LION" NECESSITIES AND "THE CUB"

ONE of the demands of the Air Ministry is that all the controls of an aero-engine must come aft (or forward according to the installation, for pusher or tractor), but anyway to a single-point. Already in the older "Lions," the cable from the single lever of the interconnected-camshaft-sliding-gear-for-valve

raises, having upon it two lever arms. From one of these two, ball-jointed rodwork goes to the throttle control of the duplex and single Claudel carburettors fitted to the "Lion." This lever, too, has a short bell-crank arm from which, by way of a tiny universal joint, a short rodwork connection goes at



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Certain new accessory details on the Napier "Lion," such as the armouring of the ignition cables with material that earths the induced currents due to the extreme high voltage, to prevent interference with directional wireless currents arriving to the aeroplane; the brass distributor shielding for the same purpose, and the cut-out cock in the return lead to the pump from the carburettor water-jacketing for flight in tropical climates.

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relief—they say these things better in German—and the new toggle-action-engaged hand-starting gear, were so located; but the others, not entirely. The latest modification, therefore, is the installation of a little stub-spindle from the column of which the middle valve gear drive-shaft

right angles and diagonally downward to the advance and retard lever of the port-side magneto, which of course has its direct rod connection to the lever of the starboard one. Consequently the movement of the throttle control advances or retards both magnetos, and, let it be said, in a much better

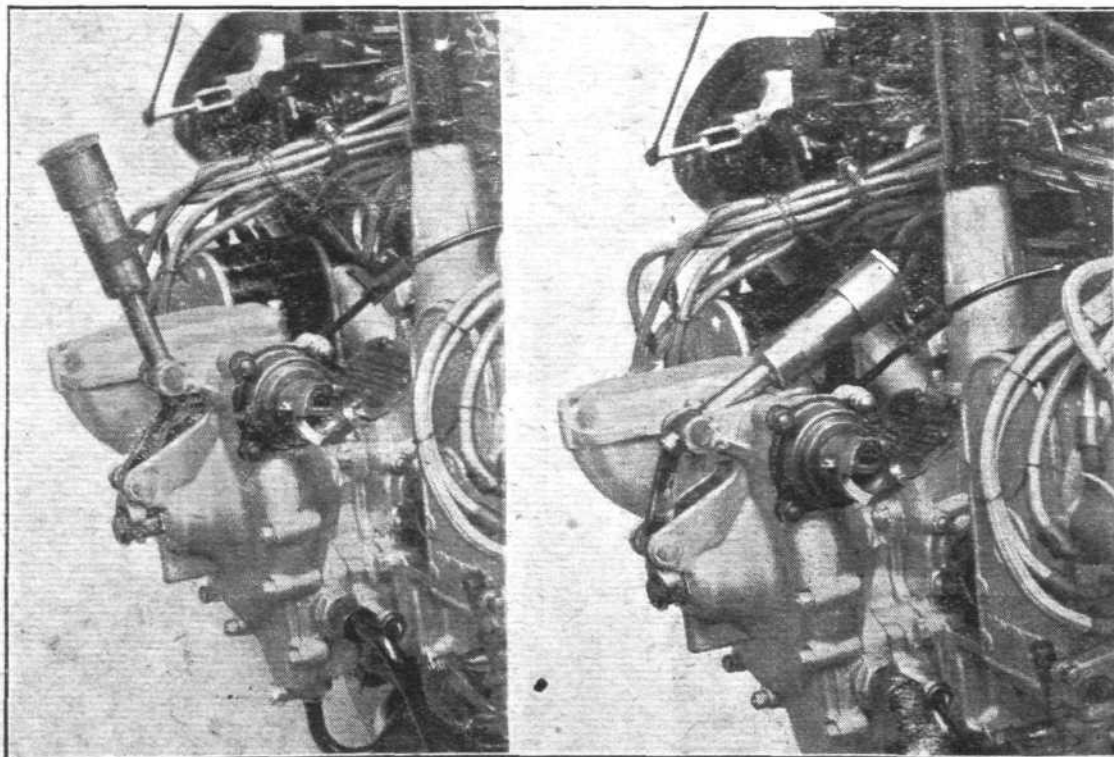
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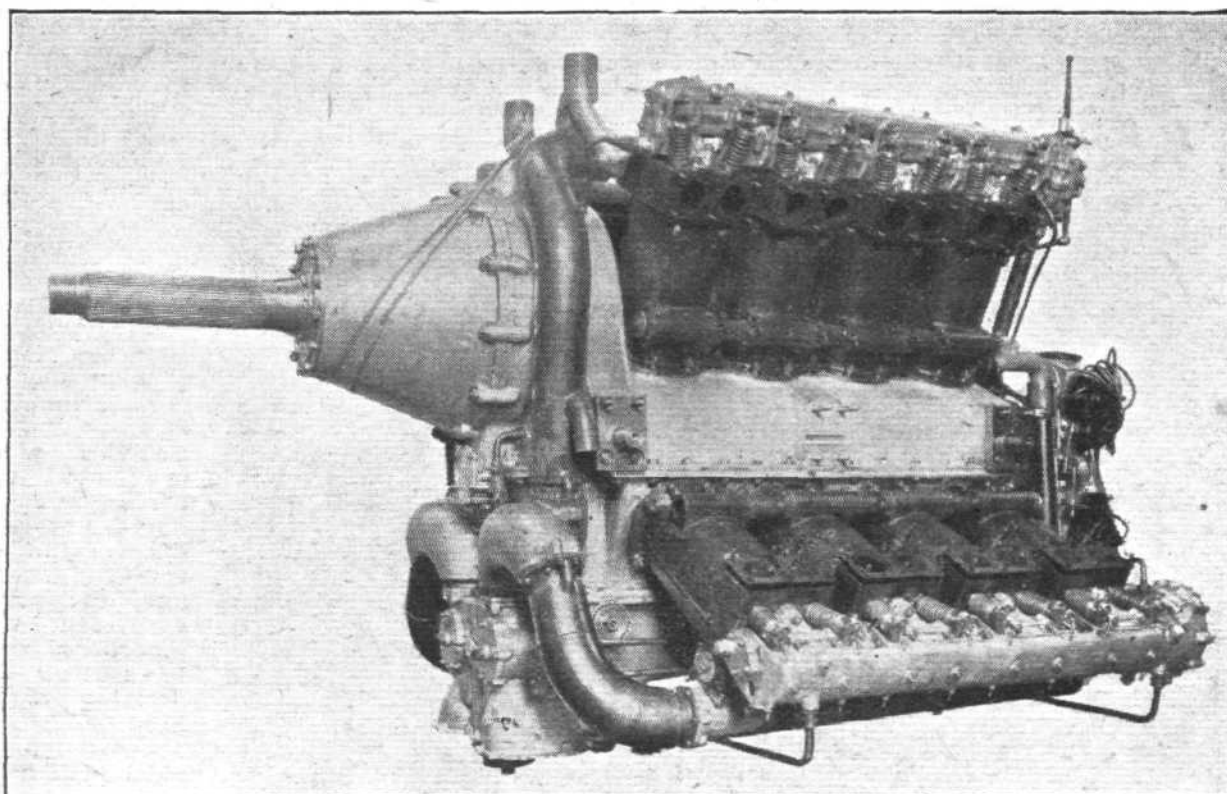
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Two views of the latest Napier "Lion" hand-starting gear, shown in the "on" position on the left, and "off" on the right, for the lever-actuated toggle-engaged clutch mechanism within, that frees itself into the off position as soon as the start is effected.

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THREE-QUARTER FORWARD VIEW OF THE NAPIER SIXTEEN-CYLINDERED 1,000 h.p. "CUB" AERO-ENGINE: Designed for the combination of high power and light weight, rendered possible by the balance (in practical opposition, due to the arrangement of the cylinder-banks at their special relative angles) of inertias and combustion effort. For greater clearness of detail, the exhaust manifolds have been stripped. But the mass-construction will be seen to be even simpler than that of the "Lion," the four units in each bank being bonded together by the valve-gear casing instead of the detachable head, and the water leads likewise arranged in a single distribution and outlet line respectively through clamped rubber unions. The induction will also be seen to be symmetrically arranged to the port and starboard banks.

fashion than is found on most cars, although automobile conditions permit the arrangement equally well.

The other control lever likewise runs to the two carburetors, but it is connected to the pressure-equalising device in each, the purpose of which—in a Claudel as in at least one

other make within our knowledge—is to equalise the pressures existing in the top of the float-chamber and in the main induction stream; an operation which becomes necessary at any altitude above 6,000 ft.

It has been found that owing to the high tension of the

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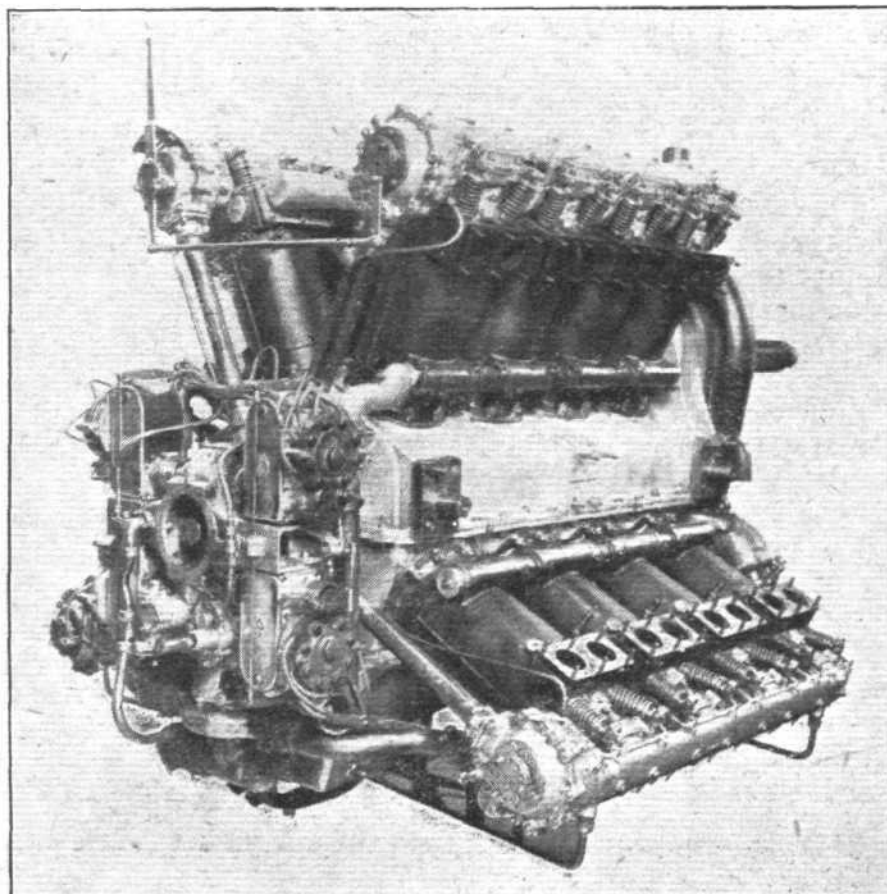
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THREE-QUARTER REAR VIEW OF THE NAPIER SIXTEEN-CYLINDERED 1,000 h.p. "CUB" AERO-ENGINE: In this view it will be seen that although the valve-gear operation differs from that of the "Lion," the same method of easing the starting by sliding the single camshaft by causing it to turn within a helically-grooved key-sleeve is embodied for the two upper banks, the two lower retaining their compression. The mounting of the eight spark magnetos above and below the hollow transverse bracket-extension of the crank-chamber will be noted. Note also that the angle of the cylinder banks enables the bearer stubs and engine bearers to clear the lower bank, and that the upward effort of this bank prevents disruptive strain between the upper and lower sections of the crank-chamber.



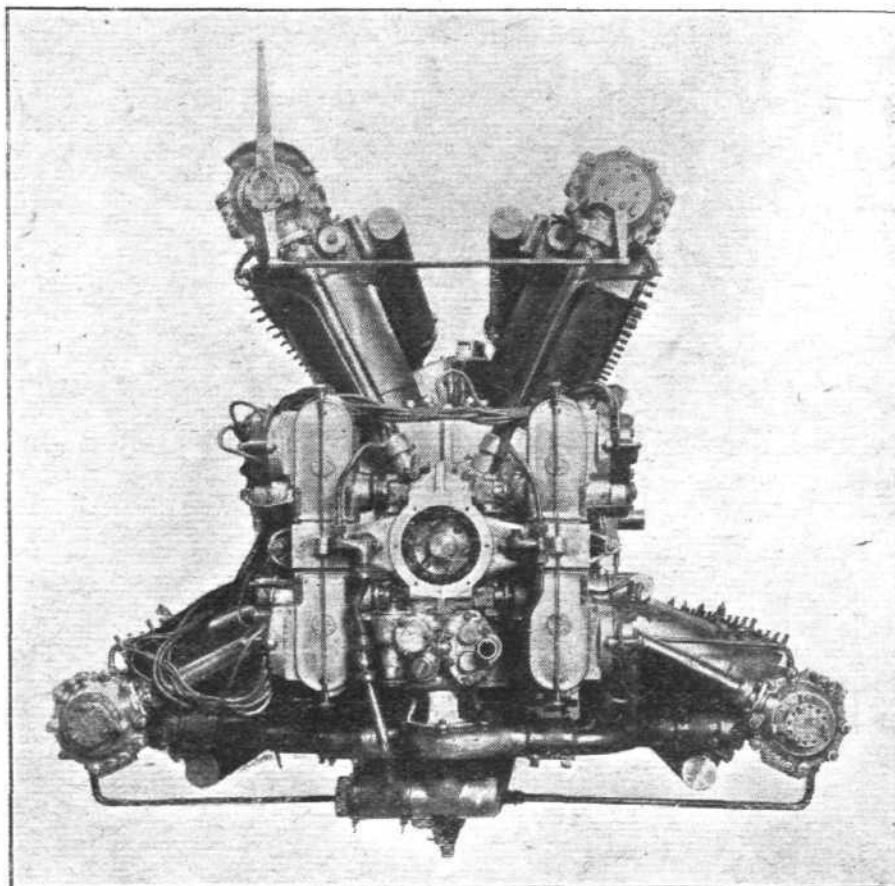
ignition, a certain amount of induction occurs—in the form of actual leakage from the cables—which, as uncontrolled eddies or waves, seriously interferes with directional wireless; as a parallel case, so to say, with the presence of iron near a ship's compass, prior to the famous discovery of Lord Kelvin, which neutralised that falsifying influence. The neutralising method here seems, in its way, to be a discovery as simple as it is important. It is merely to collect those eddies or waves, and earth them by groups into the motor. This is done by sheathing the cables in a braided covering of electrically conductive material, and carrying the cables in aluminium brackets four inches apart, secured to the top of the crank-chamber.

Still, the same high-tension current—but in lacunæ of metal twice or thrice as great as a wiring-length—exists in the distributors. So these, too, are now earthed by means of brass shields, each with a short length of copper wire attached to an earthing terminal in the crank-chamber metal. So now, while the voltage for the "Lion's" twenty-four spark-plugs remains undiminished for ignition purposes, its surplus is so neutralised that it cannot interfere with either the directional or any other wireless pertaining to the aeroplane itself.

Another new detail again relates to the carburettors. This is a cock, located in the return water lead to the pump from their water jackets. For, as it may well happen that in tropical climates water jacketing is superfluous, and might indeed lead to over-thinning of the mixture, turning this cock cuts out of circulation that part of the water system at least. It may be urged that a simple thermostat, acting, so to say, backwards, might do the same thing automatically. But then it is very much a moot-point whether such a device would be appropriate to the working conditions, about half the time, even in the tropics. It is one of those points in which the Napier designing staff, with their preference for being merely effective, are clever enough to avoid the temptation of being merely clever without being sure.

The toggle-action device for the engage-

ment and disengagement of the starting-gear was fully described in these columns many months ago, actually before it was first exhibited at the Aero Show, so needs no recapitulation; or, indeed, mention, except to say that, although a standardised fitment for hand-starting, the substitution of an electric starting motor in no way affects its construction or general assembly.



REAR VIEW OF THE NAPIER SIXTEEN-CYLINDERED 1,000 h.p. "CUB" AERO-ENGINE: Chiefly displaying the magneto mounting and the horizontal relation of the water pump.

THE 1,000 H.P. NAPIER "CUB"

First Photographs

LAST week a brief reference was made in our columns to the new 1,000 h.p. Napier "Cub," from which great things are expected. Although no details may be divulged at present, we are able to place before our readers this week a set of photographs which show admirably the general lay-out of this our most powerful aero engine unit. As will be seen from the photographs, the cylinders are arranged in four banks of four each, the two upper rows being placed at a narrow angle, while the lower are at a wide angle. Apart from the advantages of this arrangement for relieving crankshaft stresses, it has one very great advantage from the aircraft designer's point of view. The engine housing may be kept relatively narrow at the top, thus hindering the pilot's view to a much smaller extent than would a wider Vee. Also the large unencumbered space along each side of the engine facilitates the mounting in the machine.

As will be seen from the illustrations, there are four overhead camshafts operating the four valves of each cylinder. The inlet valves, as usual, are on the inside of the cylinder banks, with the two duplex carburettors that supply them placed at the forward or airscrew end, and supplying the mixture through four induction pipes, as shown. The four

magnetos are mounted on platforms on the rear end of the engine. A large reduction gear is provided, as one would expect for an engine of this power, and our propeller designers are now faced with the problem of producing an airscrew to absorb this power. That this will have to be of the four-bladed type is scarcely to be doubted.

So much, and anything else which the reader may glean from an inspection of the photographs, may be said regarding the "Cub," and no more at the moment. We might add, however, that this monument to British aero engine engineering was designed by Mr. J. Rowledge, mainly in the South of France, where Mr. Montagu Napier is residing for reasons connected with his health, and where, consequently, Mr. Rowledge went with a staff of draughtsmen. The engine, of which the first is ready for exhaustive tests while a second is coming along, was, of course, built in this country, and its performance will be watched with the keenest interest by all connected with aviation. Although designed primarily for Air Ministry purposes, there is little doubt that as a commercial proposition it will play an important part in connection with the really large commercial machine of the near future.



NOTICE TO AIRMEN

Aerodromes for Civil Use: Amendments

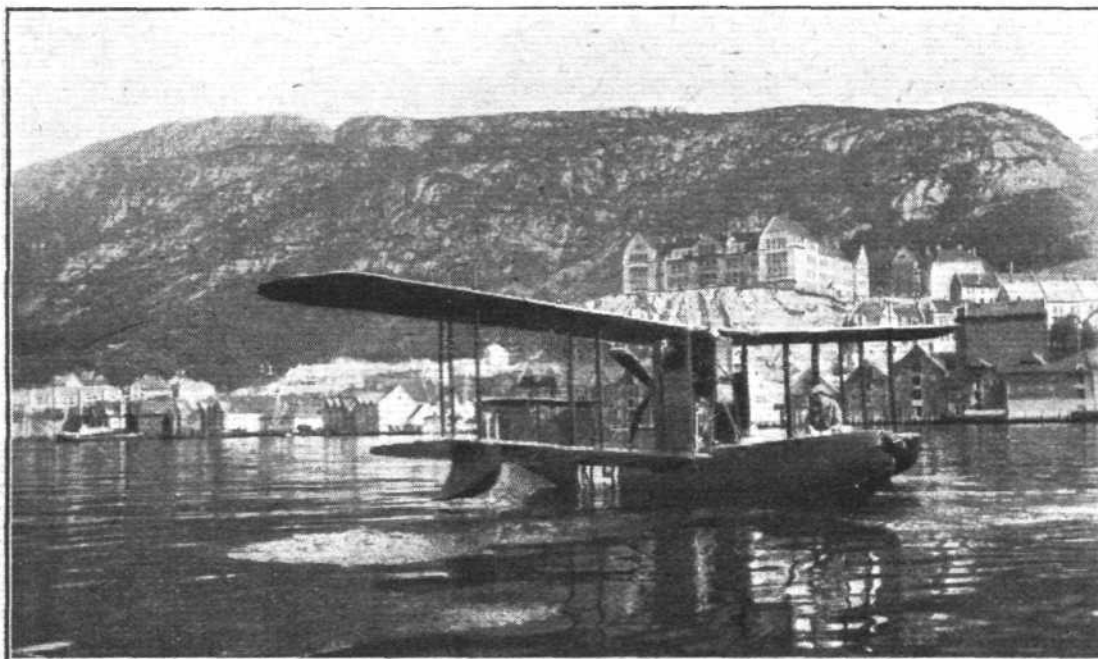
NOTICE to Airmen No. 1 of 1921 (Aerodromes for Civil Use: Consolidated List) is amended as follows:—

LIST C. Licensed Civil Aerodromes. (b) Civil aerodromes licensed as "suitable for Avro 504 K and similar types of aircraft only." Walsall should be deleted. (No. 14 of 1921.)

NORWAY'S EXPERIENCE OF COMMERCIAL AVIATION

It is a curious fact that among the countries which have attempted to run regular air services there appears to be one only which has chosen for such services the seaplane type of machine. This country is Norway, and here there were very good reasons for selecting the seaplane. The country is mountainous throughout, and consequently suitable landing-grounds for land machines are few and far between, and could only be artificially provided at considerable cost. Therefore, when the *Norske Luftfartrederi* planned a mail and passenger route between Stavanger and Bergen, it was natural that the seaplane should be chosen. Originally this firm was founded in 1918, with a fully paid-up capital of 3,300,000 kroner (normally about £183,000), and did a lot of propaganda work for the establishment of regular air mail routes along the Norwegian coast and between

available at short notice (it was then getting late in the year), the company hired one and purchased two German seaplanes, all of the Friedrichshafen twin-float seaplane type. Thus the two types were used under equal conditions, and some interesting comparisons could be made. According to Dr. Keilhau, the German machines were, if anything, the more seaworthy of the two, as regards living in a rough sea, but as the coast-line between Bergen and Stavanger has for the greater part land-locked fjords, well protected against heavy seas, it was found of greater importance to have machines which would behave well in the air. In this respect, Dr. Keilhau says, the British machines proved far superior to the German. In those Norwegian fjords there is a superfluity of gusts and swirls, with violent squalls and showery weather.



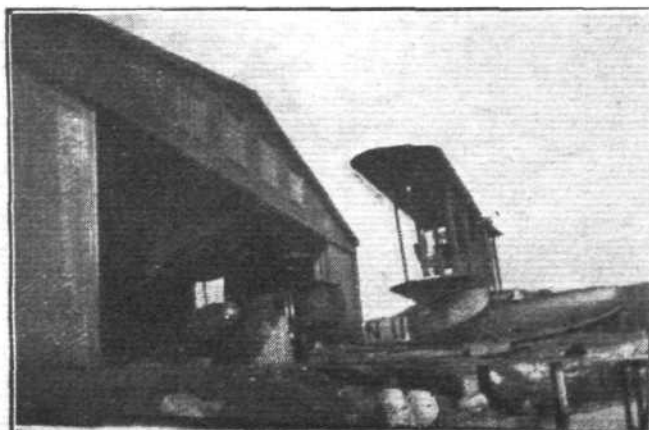
A Supermarine flying-boat, belonging to the *Norske Luftfartrederi*, outside Bergen, Norway.

Norway and the British Isles. The managing director of the firm was Dr. W. Keilhau, Commander Gyth Dehli was technical director, and Dr. Fridtjof Nansen was associated with the firm as President of the representative body. After a lot of uphill work, the firm at last succeeded in obtaining from the Norwegian Government a contract for the carriage of mails by air between Stavanger and Bergen. Operations were commenced in August, 1920.

Originally it was thought that three machines would be sufficient for the purpose, the services being so arranged that there was only one machine in the air at a time. This would leave one machine in reserve and one under overhaul. Consequently three Supermarine flying-boats were purchased and duly delivered. It was then found, however, that owing to the linking-up with the Bergen-Christiania railway it would be necessary to run two machines simultaneously, one in each direction. As no more British machines were

Especially are weather conditions very nasty, with easterly winds coming down the mountain sides. It was found that the Supermarines could go out in any weather and complete their journey when the German machines were unable to stay in the air. As regards the comfort of passengers, it is pointed out by the company that these boats ran more steadily than a railway coach, and did not sway and plunge even in the strongest gusts.

In the matter of engines, the experience of the *Luftfartrederi* was that the Supermarines would have been all the better for a little more power, the 160 h.p. Beardmores having to be run all out during the whole of the trip, in view of the unfavourable autumn weather. In consequence they needed overhaul more frequently than the more lightly-loaded Benz engines (220 h.p.) of the German machines. This is not to be wondered at, as running constantly at maximum power is a severe test for any engine.



SUPERMARINES IN NORWAY : The photograph on the left shows one of the Supermarine boats used by the *Norske Luftfartrederi*, and on the right is a view of Stavanger taken from the Supermarine boat.

The following figures of results, supplied by Dr. Keilhau, are of interest:—

Number of journeys planned ..	212
Number of journeys made ..	200
Percentage of technical reliability ..	94.4 per cent.
Number of journeys accepted by postal authorities as being to satisfactory schedule ..	196
Percentage of postal reliability ..	92.5 per cent.
Number of kilometres flown (approx.)	22,000
Number of passengers conveyed ..	64
Flights prevented by weather ..	5
Flights prevented by lack of machines	7
Flights interrupted by weather ..	0

As regards reliability, there is thus no fault to find with the first Norwegian air-mail service. When, nevertheless, it was discontinued, the reason was to be found, as in certain

other countries which we could mention, in the lack of public support. The saving in time was very considerable, and but for the fact that the surcharge fixed by the postal authorities was so high as to bring the cost up to practically the same as that of a telegram, there is little doubt that a better financial result would have been obtained. Also it would appear that the service was not advertised as well as it might have been. Thus the Norske Luftfartrederi shared the fate of several other pioneer firms, and decided to cease operations. As the figures indicate, the fault cannot be ascribed to technical shortcomings, and it is quite possible that, had the firm been in a position to carry on for a considerably longer period, success might ultimately have crowned their efforts. As it is, probably in time to come some other firm will step in and reap the benefit of the ground-work done by the original company. This, unfortunately, has been the fate of many pioneers.

GERMAN AERONAUTICAL

IN view of inaccurate statements which have appeared in the Press regarding the receipt, examination, and disposal of German aircraft, engines, and other aeronautical material assigned to Great Britain under the terms of the Peace Treaty, the following information is placed at the disposal of the Press by the Civil Aviation Department of the Air Ministry:—

Aeronautical material surrendered by Germany under the terms of the Peace Treaty is collected by the Inter-Allied Aeronautical Commission of Control, which arranges for its allocation to the various Allied Powers.

The material allotted to Great Britain is despatched by rail to Antwerp in sealed cases, which are opened in the presence of Belgian officials. The material is taken on charge by the Royal Air Force Port Detachment, and is carefully surveyed by special officers of the Research Department of the Air Ministry, who select those articles which appear to be of technical or scientific value.

The Air Ministry is also informed direct by the Inter-Allied Aeronautical Commission of the material which will arrive at Antwerp, so that the Director of Research may be fully informed of the position.

No material is considered surplus until it has been carefully inspected and rejected by the special technical officers of the R.A.F. A further survey is then made for articles suitable for War trophies and museum exhibits.

All material selected is shipped to the Royal Air Force experimental stations, where a considerable amount has already been collected and is now undergoing the most minute inspection and test at the hands of experts. Several machines of various and important types are expected to be ready shortly for actual flying trials in the air. Many types

MATERIAL AT ANTWERP

of aero engines are at present undergoing running tests on the bench, and it is anticipated that very complete data will be available as a result of the experiments conducted upon them.

All supplies of the special types of Maybach engine required for the purposes of research are being transhipped from Antwerp to the experimental stations in England.

The material remaining at Antwerp, after the process of selection, is handed over to the Disposals Board of the Ministry of Munitions. In accordance with the orders of the Supreme Council, no aeronautical material received from Germany may be disposed of unless it is reduced to scrap. This surplus material will, therefore, be reduced by the Disposals Board *in situ*, and sold locally. Hitherto, however, no reduction has taken place, as the arrangements of the Disposal Board are not yet completed.

It has been decided that the reduction and consequent sales should take place in Antwerp, first to save the cost of shipment to England, and, secondly, to meet the views of the Society of British Aircraft Constructors with regard to the introduction of German material into this country.

No stores have been tampered with while in transit to Antwerp, but thefts of material are known to have occurred at earlier stages. In all cases the stolen articles have been of little commercial and of no technical value. It is also certain that pilfering took place during the period between the Armistice and the institution of the Aeronautical Commission.

The work of the Inter-Allied Aeronautical Commission is still proceeding, and full advantage is being taken by the Air Ministry of the material allotted to Great Britain.

Afghanistan Campaign, 1919

THE Air Ministry announces that the "India General Service Medal, 1906," in silver, with clasp, "Afghanistan N.W. Frontier, 1919," will be granted to *personnel* of the Royal Air Force who took part in operations against Afghanistan in 1919, and who served:—

(a) West of the Indus, exclusive of the Province of Sind, between May 6, 1919, and August 8, 1919, both dates inclusive.

(b) Under the orders of the General Officer Commanding the Baluchistan Force, on the East Persian lines of communication between May 6, 1919, and August 8, 1919, both dates inclusive.

(c) In North-East Persia under the orders of Maj.-Gen. Malleson, C.B., C.I.E., between May 6, 1919, and August 6, 1919, both dates inclusive.

Officers and airmen who took part in the campaign and are no longer serving should apply direct to the Air Officer Commanding, Headquarters, Royal Air Force, Ambala, India, giving details of their qualifying service, with dates, and the permanent address to which the medal and clasp may be sent. The claims are subject to approval by the Air Council.

Brussels Air Mail Change

THE Postmaster-General announces that the latest times of posting for the air mail to Brussels will, until further notice, be the same as those for the air mail to Paris, and at certain post offices in London where letters for the service can be specially handed over the counter, the latest times will be about fifty minutes earlier than formerly, namely:—

G.P., 10.40; Threadneedle Street Branch Office, 10.25; Lombard Street, 10.25; Parliament Street, 10.05; Charing

Cross, 10.25; W.C.D.O., 10.45; W.D.O., 10.25; S.W.D.O., 10.20; and S.E.D.O., 9.0, all a.m.

Registered letters must be handed in five minutes earlier in each case. The latest times of posting in the provinces remain unchanged.

Well Known Pilots Retire

THEIR many friends will be sorry to hear that Mr. L. R. Tait-Cox and his colleague, Mr. J. H. James, both Nieuport pilots, have retired from aviation. Both are very fine pilots, and their loss to aviation is greatly to be regretted. We wish them both the best of luck in other spheres.

Weight of Aveline Stabiliser

WE are very pleased to find that in our last issue we made, through a misunderstanding, a mistake in the figure for the weight of the Aveline stabiliser. The weight was given as 300 lbs., whereas in point of fact it is only 150 lbs. as fitted in the Handley Page. This figure includes all extra cables, frames for mounting, etc. The mistake arose through the figure of 150 lbs., which we took to be that of one set only, whereas it included both sets (elevator and ailerons). On future installations the weight will be reduced to 100 lbs. for large machines, and possibly an intermediate set will be standardised which weighs about 70 or 80 lbs. For small machines (single-engined single-seaters and two- or three-seaters) M. Aveline's patents cover the use of light servo-motors of the friction-disc type, operated by a small windmill. The electrical part of the installation will remain the same in principle, but the friction-discs will take the place of the compressed air reservoir and cylinders. Such an outfit, it is estimated, can be built for a weight of about 20 lbs. or so. The future owner-driver who is not a particularly good pilot should benefit from this set.

A NEW DUTCH COMMERCIAL AEROPLANE

The N.A.V.-6 220 H.P. Benz Engine

ONE of the results of the prohibition imposed upon Germany by the Allies has been to force a number of German aircraft designers and skilled aircraft workers to go abroad, in order to avoid leaving the industry altogether. Holland is one of the countries which German aircraft experts appear to favour as a temporary home until construction in Germany becomes permitted again. Thus it is natural if one finds, in practically all the Dutch machines, strong family resemblances to well-known German types of aeroplanes. One instance was the Fokker, which may or may not be a *bona fide* Dutch production. Lately a new addition to the "Dutch" aircraft industry is the "N.A.V." whose latest machine is the limousine shown in the accompanying general arrangement drawings, which we reproduce from the German aviation journal *Illustrierte Flug-Woche*. The initial letters N.A.V. refer to the name of the firm, which is *Nederlandsche Automobiel en Vliegtuig Onderneming*, with headquarters at Enykaaude, Maas, Holland.

The N.A.V. 6 has, it will be seen, a very strong resemblance to the German "Kondor" war machines, and it is understood that, as a matter of fact, German draughtsmen and workmen from the Kondor works are responsible for its production. The machine is, in many respects, similar to the Sablatnig as regards its general arrangement, with the cantilever thick-section wing and the pilot seated behind the passenger cabin.

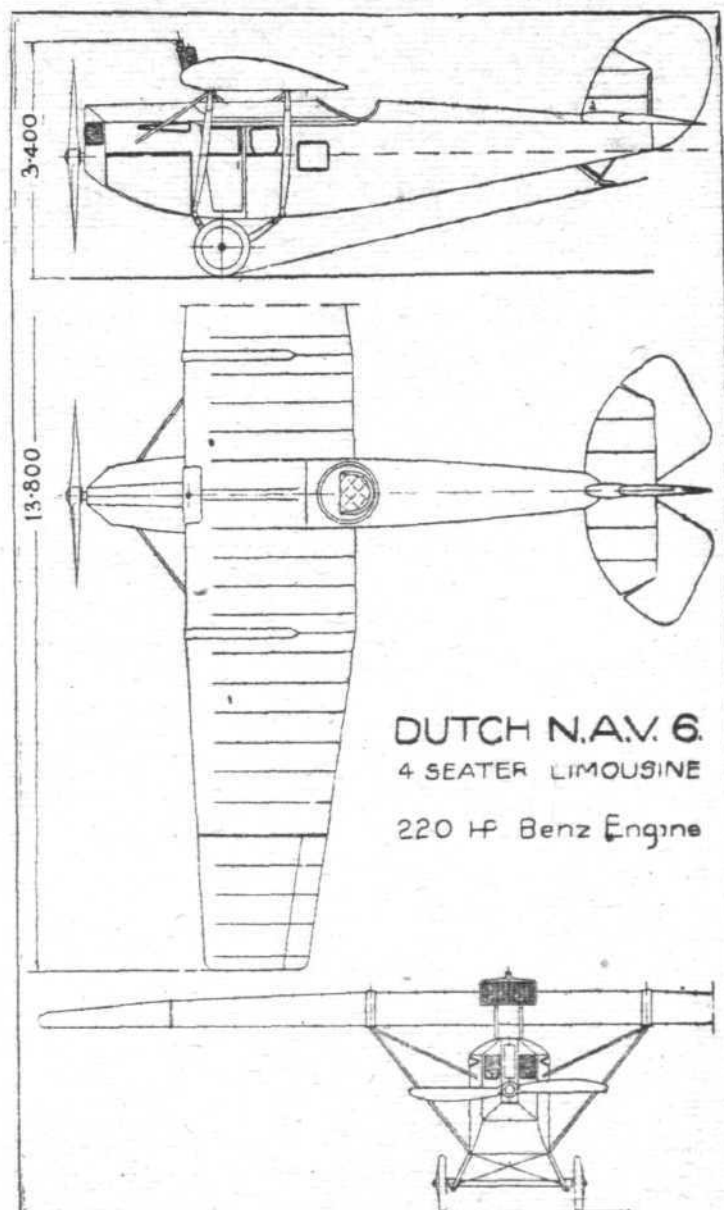
In the N.A.V. 6, however, the wings are truly cantilever wings, whereas in the Sablatnig the load on the wings is relieved by a pair of lift struts on each side, an arrangement which, while adding a certain amount of resistance, adds enormously to the strength of a wing, which already has fairly deep spars. It is quite probable that this modification of the true cantilever wing will become popular in the future, especially for biplanes where a single pair of struts and single-bay bracing will then suffice for biplanes of comparatively large span. The cabin is meant to accommodate four passengers, but our German contemporary points out that the space is very cramped, which is not conducive to a feeling of security on the part of the passengers.

By a special form of construction the cantilever wings have been built for as light a weight as 1.64 lbs./sq. ft. (Nothing is said regarding factor of safety.) The span of the wing is 45 ft. 3 ins., and the maximum chord is 8 ft. 4 ins., diminished to 5 ft. 10½ ins. at the tip. The maximum thickness of the wing section is 1 ft. 5½ ins. The wing is supported on three struts on each side, two of which run to the lower longerons of the fuselage, the third being a drag tube running forward to the top longeron near the nose. These struts are streamline steel tubes. The wing appears to be built up in five sections. The centre section is, of course, in one piece, and each end section appears to be made up of two pieces, joined at the line where occurs the root of the aileron. Probably this has been done with a view to reduce the space required for crating the machine.

It appears that there are two radiators, one mounted on the leading edge of the plane and the other in the nose. Probably arrangements have been made for blanketing one

of these, thus reducing the cooling surface to approximately half.

The engine is a 220 h.p. Benz, and the engine housing is arranged similar to the bonnet of a car, with two flaps which lift up for inspection of the engine.



General arrangement drawings of the Dutch N.A.V. 6 four-seater limousine.



The N.A.V. 6 Limousine : Three-quarter front view.



THE N.A.V. 6 LIMOUSINE: Three-quarter rear view.

The weight of the machine empty is given as 2,640 lbs., and the useful load as 1,100 lbs. It is expected that the speed will be about 100 m.p.h.

The area of the machine is 395 sq. ft., which therefore gives a wing loading of about $9\frac{1}{2}$ lbs./sq. ft. The power

loading is 17 lbs. per h.p. Sufficient fuel is carried for a flight of five hours' duration (at cruising speed, probably), or a range of approximately 400 to 450 miles. It is possible that one of these machines may pay a visit to this country before long.

PHOTOGRAPHIC MAPPING OF AIR ROUTES

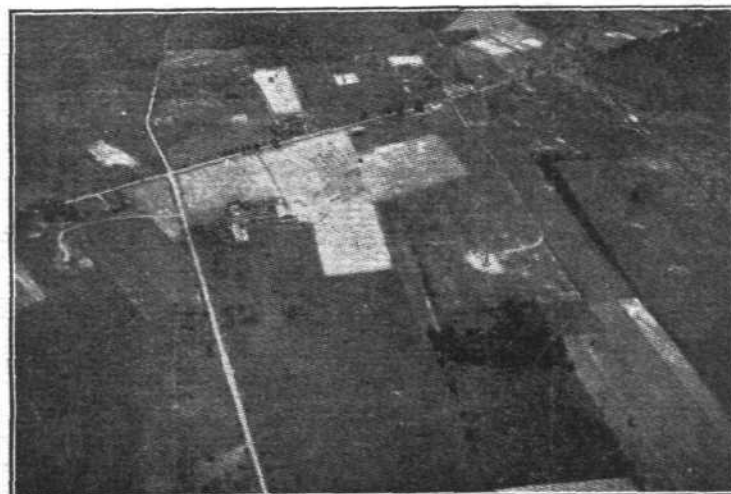
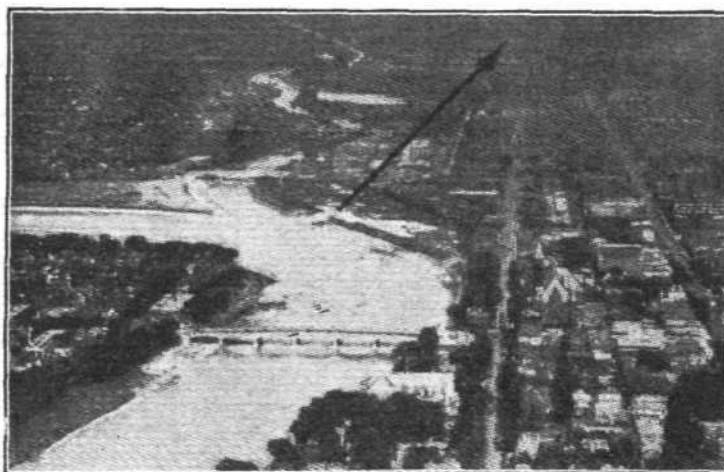
America to Make a Practical Start

ALTHOUGH it has long been recognised that photographic maps of air routes may be of great assistance to pilots, little practical use has been made of such maps up to the present time. It now appears that America is to take the lead in this direction, as the new Civil Affairs Division of the United States Air Service has undertaken to produce aerial photographs of all the main air routes. A beginning will be made with the air route between Washington, D.C., and Dayton, Ohio, this route having been chosen partly because it is a difficult one, crossing large industrial centres where visibility is often bad, and partly because aviation headquarters are in Washington, while Dayton, Ohio, is an aircraft manufacturing centre.

The scheme provides for a series of air route files, aerial photographs to be taken of all the important towns on the routes and of the aerodromes of each town, with information relating to the condition of the aerodrome, obstacles to avoid, etc., printed at the foot of the photographs. Each town and aerodrome will be photographed from both sides of approach so as to give the pilot as near as possible the identical view which he himself will obtain.

It is hoped to secure the co-operation of towns, so that marked in some prominent place on the roof of or on ground adjoining railway stations will be the number of the town, followed by the initial letter of the state in which the town is situated. For instance, Richmond, Virginia, might show the number 12-Va. The maps will be so arranged as to take in a strip of country each side of the route, and information will be given of towns somewhat outside this band, so that if a pilot loses his way through fog, etc., he will be able, by coming down low and following the first railway, to pick up the number and initial letter of the station, and hence be able to ascertain his position and set his course accordingly.

The idea appears to be a most excellent one, and might with advantage be taken up in a practical way in this country also. The main routes to the Continent would form a good subject for a beginning, and would give quite a lot of useful work to R.A.F. pilots and observers who are now, through no desire of their own, kicking their heels at various air stations. In this manner very direct assistance would be given to civil aviation, while at the same time the personnel would be prevented from getting stale. Later on some of the inland air routes could be similarly treated, but as these are scarcely in running order yet there is less need for them at the moment. To the pilots who know the London-Paris route inside out there would not be any great necessity for such photographic maps, but to pilots who are more or less unfamiliar with the route they would undoubtedly prove a great boon, and in years to come no doubt many flights will be made by pilots who are not familiar with the air routes from London to the Continent.



AIR PHOTO.-MAPS: These two photographs when pasted back to back by a special process, form a thin "card" of the aviator's index. The illustration above shows a town as seen by the aviator from the direction of approach, and the arrow indicates the location of the landing-field. The illustration below is the reverse of the "card," and shows view of the landing-field as seen by the aviator.

AIRSHIPS FROM THE FOUR WINDS

SEPTEMBER has been fixed for the 1921 International Gordon-Bennett Balloon Race, and Brussels is the centre for starting. The British competitors will be selected by the Royal Aero Club, and anyone wishing to compete should communicate at once with the secretary of the Club, 3, Clifford Street, London.

FROM the success which has attended the mast-mooring experiments at Pulham Aerodrome with "R.33" at the beginning of last week, it is evident that had a mast been installed at Howden the destruction of "R.34" the other day would not have fallen to be recorded. The lesson has been a costly one, and may lead to proper provision being speedily made against future contingencies, irrespective of the exact methods which will be employed to carry on British airship traffic, commercial or otherwise.

WHAT may appear as A B C to the scientist of many degrees, is not always quite so distinctly clear to the layman of ordinary everyday perception. Therefore to have an understandable exposition upon the Einstein theory is something to be thankful for. This is due to the offer of a 5,000-dollar prize offered by the *Scientific American* for the best non-mathematical account of the theory, and we are pleased to record that the winner of this reward, Mr. L. Bolton, M.A., is one whose work during the War was mainly in connection with anti-aircraft gunnery in the Inventions Department of the Ministry of Munitions. Mr. Bolton, who was formerly a scholar of Clare College, Cambridge, has been

in the Patent Office for thirty-six years, and is now a senior examiner.

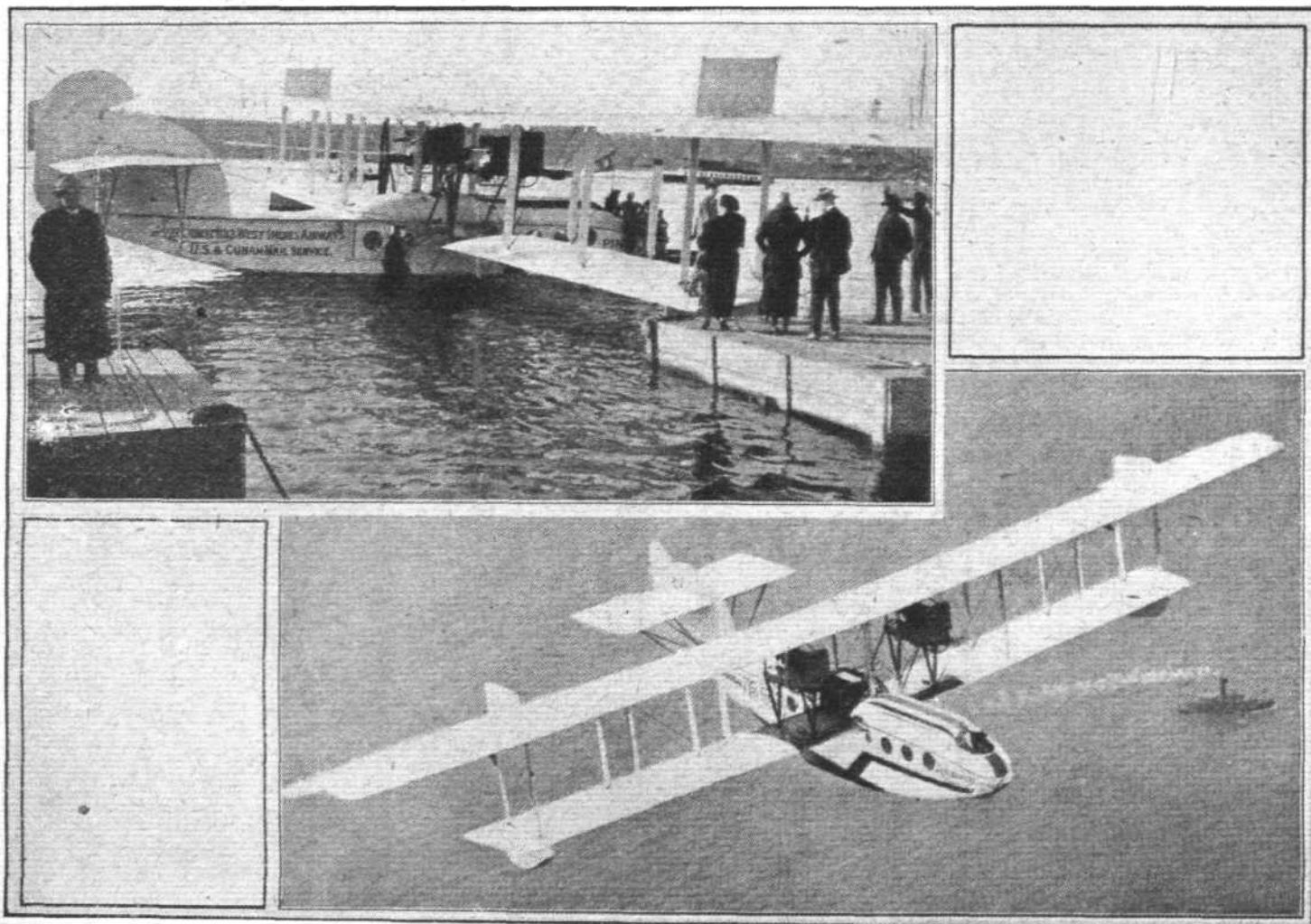
HENRY FARMAN is ever for progress, and for some time he has been occupied with air-screw experiments on hydroplanes, otherwise "gliding boats." On Saturday he was testing his new creation at Frette-Herblay with considerable success, attaining an average speed of 60 k.p.h., at one time, near Conflans, 90 k.p.h. being reached. The craft, which is fitted with a 140 h.p. Renault engine, is 10 metres long, uses a four-bladed tractor screw, and has a capacity of 1,400 kilogs. Upon the trial run she carried twelve passengers, Henry Farman being at the wheel.

AT Buc the four-engined monster Blériot aeroplane is still putting up stunts in the hands of M. Jean Casale. On February 5 he did a climb of 3,000 metres.

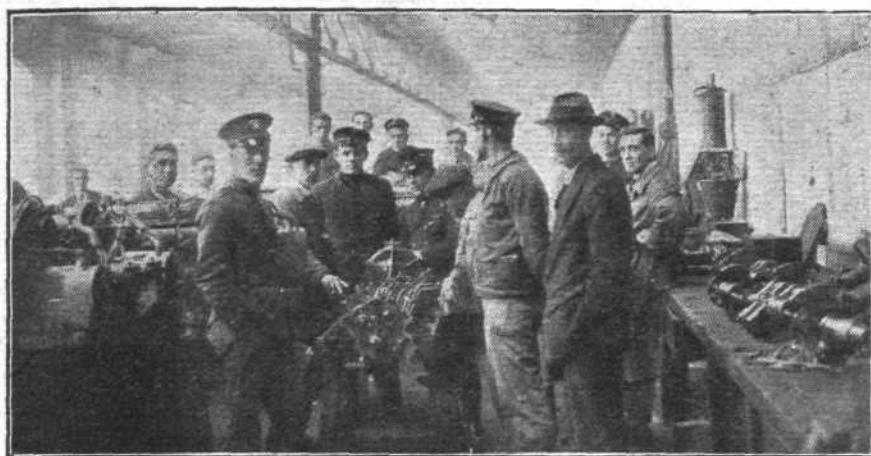
THAT business is really meant for utilising aircraft in connection with the fishing industry is evident from the fact announced that four small non-rigid airships of the "Blimp" type, and a British aeroplane of the latest type, have just been purchased by a private company for work in Newfoundland in this connection.

"Is cavalry obsolete?" is the query set out in an evening contemporary, the following non-committal answer being supplied as an excuse for putting the question:—

"There is talk in military circles of a possible reduction in



An all-year daily service is being flown, and has been in operation some time, by the Aeromarine West Indies Airways Co. between Key West and Havana, a distance of about 100 miles, which takes a little over an hour by air. The above views show one of the six 11-passenger flying-boats employed on this service, taking on passengers and in flight. This is a similar service to the new one mentioned in "Flight" the other week by the Transair Co.



PREPARING TO TAKE OVER "R.38": An American crew studying the installation of one of the Sunbeam engines of "R.38," purchased by the U.S.A.

the strength of the cavalry during the next few months; but this is not to be taken as indicating that any of the mounted regiments now in the Army List are to be disbanded.

"With the advent of the aeroplane the uses of cavalry in modern warfare have, of course, been greatly diminished,

and there are even authorities who consider that the whole force is obsolete."

It was only last week that we mentioned the election of Mr. Myron T. Herrick to the Presidency of the Aero Club of America, and now the report is circulated, and finds much favour, that he is a possible U.S. Ambassador to this country. As we then stated, Mr. Herrick was one time U.S. Ambassador to France, in the very critical days of 1914, and a characteristic story of him is now being recalled.

On being congratulated on his escape from a German bomb which fell near the Embassy in Paris: "Don't you think," he asked, "that the death of an Ambassador of the United States would have been more useful to you just now than his life?"

Mr. Herrick's appointment should be helpful to Anglo-American relationship, as he is not without British ties, he being an offshoot of the Leicestershire Herricks, the descendants of the poet.

HAVING considerable support from the French constructors, it is now quite possible that an Aeronautical Salon will be organised in Paris at the Grand Palais, either in December this year or January, 1922.

ROYAL AERONAUTICAL SOCIETY NOTICES



Lectures.—Next meeting at 5.30 p.m. on February 17, when Mr. F. Handley Page, C.B.E., Fellow, will read a paper on "The Handley Page Wing."

Obituary.—It is with great regret that the death of Col. James Smith Park, M.V.O., is announced. Col. Smith Park was one of the most active Members of the Committee of the Scottish Branch, on which he had served since its inception.

Donations.—The Council desire to acknowledge with grateful thanks the gift from Mrs. Lawrence Hargrave of a large

number of notebooks, papers, negatives and lantern slides belonging to her late husband. Lawrence Hargrave did a large amount of most valuable experimental work in Australia, mainly in connection with kites, between the years 1884 and 1908, and is deservedly considered one of the most important of the early pioneers of aviation. Arrangements have been made for these records to be carefully gone through, with a view to the extraction of any data which should be put on historical record and which has not been previously published.

W. LOCKWOOD MARSH,
Secretary



Obituary

On October 15, 1920, at Colombo, Ceylon, of pneumonia following on enteric fever, HORACE A. H. LEETHAM, late R.A.F., only son of Mr. A. R. P. Leetham, Government Inspector of Schools, and Mrs. Leetham, of "Stella Maris," Browning Road, Colombo, Ceylon. Deeply mourned by his Service friends.

To be Married

The engagement is announced of Capt. ALBERT BAIRD FANSTONE, A.F.C., late R.F.C. and R.A.F., younger son of the Rev. James and Mrs. Fanstone, of Hassocks, Sussex, and RUTH, only daughter of the late Mr. WILLIAM HILL and of Mrs. HILL, of 3, Palmeira Square, Hove.

The marriage arranged between FRANCIS HARBROE SHALES, Flying Officer, R.A.F., and SYLVIA VIOLET WARNER, daughter of Mr. and Mrs. J. C. Warner, St. Mary's, Winchester, will take place quietly on Thursday, February 17, at the Parish Church, Marylebone, London.

Air Mails and Malta

REFERENCE was made recently to the possible opening up of the postal service to Malta by the advent of the airship voyages contemplated by the Air Ministry. It is now stated that the Maltese Government offers £16,000 per annum as a subsidy for the conveyance of mails to and from Syracuse.

The engagement is announced of ERROLL D. SHEARN (late Capt. Hampshire Regt., and R.A.F.), of Kuala Lumpur, F.M.S., and Sidcup, Kent, and DOROTHY, only daughter of Mr. C. W. E. PITTAR, I.C.S. (retired), and Mrs. PITTAR, of Elmdene, Banbury Road, Oxford.

Items

Col. SMITH PARK, for forty years connected with the Allan Line and latterly a director of Sir William Beardmore and Co., died suddenly in Glasgow on February 1. He gave important evidence on behalf of shipowners before Royal and other commissions, and was an ardent advocate of universal physical and military training. He took part in the first trip of the airship "R.34."

The will of Mr. EDWARD BREMER BUCHANAN, of Hampstead, N.W., Assistant Irrigation Officer, Mesopotamia, formerly of the Artists' Rifles, R.F.A., and later Flight Commander, R.A.F., who was killed by Arabs, has been proved at £1,301.

There are only about five tons of mail matter to be transported each week.

For this the Government is prepared to pay at the rate of about £60 per ton, and there are no doubt passengers who would prefer air travel at a fare of £5 to £10 to travel by the Italian steamships at £7 10s.

GROUND ENGINEERING*

By Lieut.-Col. H. W. S. OUTRAM

IN his introduction the lecturer referred to the framing of the Air Navigation Regulations which came into force on April 30, 1919, and especially that part of the regulations dealing with ground engineers. He pointed out the reasons which necessitate the creation of a new class of official, and wherein the inspection of aircraft must necessarily differ from that of other vehicles of locomotion.

Examination of Ground Engineers

Col. Outram outlined the procedure of examination of candidates by a Board composed of Air Ministry inspectors, and pointed out that any such examination can only guarantee to weed out those who are insufficiently qualified. The Board, he said, can do no more than state that in their opinion a candidate is reasonably likely to be an efficient ground engineer, and it would appear that the only way to determine definitely whether a man is a properly qualified ground engineer is to watch him at his work, and in particular to note the results of such work.

After pointing out that it is seldom that any one man is called upon to cover the whole range of a ground engineer's duties, the lecturer gave the following subdivision of licences into four categories:—“(a) Rigging and daily maintenance of aircraft at the aerodrome; (b) overhaul and construction of aircraft; (c) top overhaul and daily maintenance of the engine, and (d) overhaul and construction of aero engines.” “The majority of candidates may be divided into two classes,” the lecturer said.

“One class has a sound knowledge of aerodrome practice, a fair knowledge of ordinary workshop methods, and a surprising ignorance of the qualities of the materials from which an aircraft or aero engine is built, and even less of the many ways in which such materials may be spoilt by bad treatment and ignorance of their peculiar properties. The other class consists of men whose experience has been limited to a large extent to the construction of aircraft or aero engines, and who have gained the knowledge of materials referred to above, are expert in modern aeronautical workshop practice, but have only a very general or theoretical idea of what happens when the aircraft takes the air. Each of these classes is again sub-divided into the metal-worker and the wood-worker. Generally a candidate with good and sound knowledge of metal work has but an elementary knowledge of wood and non-metallic materials, or his knowledge of the latter predominates. Only a few men have shown equally sound knowledge of both branches of aircraft construction.

“It has been found that in the majority of cases a candidate can be placed in one of these classes within the first few minutes. The remainder of his examination is spent in ascertaining whether his experience and knowledge in the other divisions are sufficient to warrant a recommendation.

Supervision of Ground Engineers

“The examination of a ground engineer is only completed when his work has been watched. In order, therefore, to supervise the work of the ground engineer, the power of reinspection provided in paragraph 6 of Schedule 3 of the Regulations and paragraph 8 of Part IV of the ‘Directions’ is exercised. It was decided to arrange for periodical reinspection of all aircraft in use, and thereby supervise the work of the active ground engineers. The method adopted is as follows:—All certified aircraft must fly from licensed aerodromes. The Air Ministry have a complete list of such aerodromes, which is kept up to date. Each is visited in turn, and the aircraft examined, the work done by the ground engineers responsible for the daily certificates for such aircraft being checked and noted. It has been found that this method gives a useful record of nearly every ground engineer who is operating. Should any escape such supervision, the fact becomes apparent when they apply for renewal of their licence, and in such cases particulars of the work done are required.

“The first two years’ supervision has shown that operators may be divided into two classes: those whose chief aim is to run a regular and reliable service; who have a number of machines in operation, and employ an organised staff of ground engineers; and the owner-operator or small syndicate with one or two machines, whose main object is to obtain the biggest return for their outlay by “joy-flying,” exhibition flights, and the like, at sea-coast resorts or inland holiday centres. It is appreciated that at this stage the latter class of operator is important from the point of view of the public

education in flight. It is, however, this latter class of operator that requires the more careful supervision, and it is claimed that the small number of accidents which have occurred have proved that adequate and efficient supervision is possible without undue expense to the State or such a degree of State control as to seriously hamper the operator.

The Duties of a Ground Engineer

“(1) A ground engineer is responsible for maintaining the validity of the certificate of airworthiness, and to do so is required to certify each day on which a flight is made that the aircraft is safe in every way for flight. The experience during the past two years has been that in some cases there has been a tendency to consider such certificates as merely a piece of formality which must be fulfilled.

“Sometimes the ground engineer hands over the machine to the pilot, and takes but little, if any, interest in what happens on its journey, although the pilot generally bases his certificate as to fitness for each flight on the ground engineer's daily certificate, and may also rely on the ground engineer to see that the petrol, oil and water in the tanks are sufficient for the proposed journey. The ground engineer is responsible for the airworthiness of the machine until the very moment when it takes the air, and the last few minutes on the ground and the first few in the air often provide evidence which should be carefully noted.

“(2) Aircraft require continuous maintenance, and the ground engineer is responsible that the machine to which the original certificate of airworthiness was granted is unaltered by such maintenance. He must also consider the conditions under which the machine is stored; how these are likely to affect the various parts of which the machine is composed.

“The ground engineer must decide when it is necessary to fit a spare part, whether this be a nut or a complete component. The mere fitting of the new part is but the smallest part of this duty. He must satisfy himself that the part has been correctly made in accordance with the drawings on which the certificate of airworthiness was granted, and is of the material specified in these drawings. It must have been inspected during construction (as laid down in detail in paragraph 21 of Section 3 of the ‘Directions’), and he must have actual evidence that it has passed such inspection, and further, must satisfy himself that the part has not been damaged or deteriorated since such inspection was carried out.

“(3) The certificate concerning the fitness of the engines is probably one of the most difficult duties of a ground engineer. Obviously the airworthiness of the aircraft depends very largely upon the engines. Records taken over a considerable period show that for every eight forced landings due to engine failure, one is actually due to defect in the engine itself, the remainder being directly caused by some default in the installation of the engine. So long as the engine and the aircraft structure are designed as separate units, installation must remain a weak point of the whole machine, so that the ground engineer must give his constant attention to the daily routine of cleaning petrol filters, checking petrol flows and water connections, etc., ensuring that all ignition leads, switches and contacts are in good order. He should verify each day that the engine runs up to its proper speed, see that the oil pressure builds up and is properly maintained, and that the radiator temperature is normal. He should also make a point of inquiring of the pilot as to any sign of excessive engine vibration in the air, the flexibility of the engine and any unusual circumstances which may have characterised its running during the daily trips.

“The repairing of an engine requires on the part of the ground engineer in charge of it almost a wider and more detailed knowledge than is needed in the building-up of a new engine, in that he must determine the safe limits to which crankshafts, cylinders and the like may be re-ground, and the extent to which part-worn components may be retained. A sound knowledge of materials and their heat treatment, too, is essential to justify his responsibility in the acceptance of new parts. This all-round knowledge is not easily obtainable under normal conditions of works organisation and employment.

“(4) One result of both Service and civil experience is that various small points come into prominence which it is desirable to draw to the notice of all ground engineers. ‘Notices to Ground Engineers’ are therefore issued. They are published in the technical press and are sent to all regis-

* Extracts from Paper read before the R.Ae.S. on February 3, 1921.

tered owners of aircraft, who are expected to pass them on to their ground engineers.

"It is here urged that ground engineers and aircraft operators generally should suggest matter for such Notices. Experience with any particular type of aircraft or engine usually brings to light the little troubles to which it is particularly prone. Such experience gained by the larger companies operating a number of machines would be of value to the owner or operator of a single machine of the same type, and in many cases to owners of machines of similar types, and could often be published as 'Notices to Ground Engineers' with advantage.

"Occasionally particular points of weakness only become apparent after more or less prolonged use or as the result of an accident. When such cases come to light the certificates of airworthiness for all machines of the type in question are suspended until such time as the defect has been remedied. Information of such suspensions is issued as a 'Notice to Ground Engineers.' Once the ground engineer's attention has been drawn to a point of weakness it is sometimes possible to permit the aircraft to fly until temporary or permanent replacement has been made without taking the machine out of service.

"(5) The insurance of aircraft is already of such importance as to call for a separate paper, and on this occasion it is only proposed to touch on one aspect, that of the relation of the ground engineer to the insuring company. So far as the Air Navigation Regulations are concerned, the ground engineer is only required to certify that the aircraft is in every way safe for flight. The risk of insuring any aircraft is governed to a large extent by the following points, all of which have to be taken into consideration:—



R.A.F. Reservists

It is officially stated that men belonging to Class E, R.A.F. Reserve, are not eligible for enlistment with the Territorial Force; but it has been agreed by the Air Ministry that, in the case of such reservists who have already enlisted into Territorial Force units, such enlistments may stand as special cases.

No. 2 Aircraft Depot

A REUNION dinner was held on February 4 at the Cock Tavern, Fleet Street, Col. C. G. Smith being in the chair. At the dinner, to which 27 guests attended, No. 2 A.D. Officers' Association was formed. All particulars of this Association can be obtained from Mr. J. D. Fairbairn, Hillsborough, Cromwell Avenue, Bromley, Kent.

Another Aerodrome Taken Over

Forty acres of the aerodrome ground and sheds at Hucknall, Notts, have been sold to the Mansfield Engineering Company, who intend establishing there a wagon-building works. The W.O. is still going strong, as it is stated that the War Office have a retaining clause that if hostilities break out they shall once more have possession of the site. So it looks as if after all Dora one of these days may be expected to succumb to old age.

Auction at a Scottish Air Station

By direction of the Disposals Board, Messrs. J. and R. Edmiston, auctioneers, Glasgow, have sold by auction the plant, machinery, sheds, etc., at Luce Bay Air Station. There was a large attendance from all parts of the country, and bidding was keen. The large airship shed found a purchaser at £2,750, four wind-screens brought £196 each, and a 40 h.p. marine type paraffin and petrol motor-engine £265.

Lloyd's Pilots' Book Record

LLOYD'S have now issued a Record Book of all aircraft pilots who hold British civil aviation pilots' licences.

The book is similar in form to the Aircraft Record Book, which has already made its appearance. A separate page in the book is devoted to the particulars of each pilot. Details are given of the pilot's name, address, date of birth, licence type and No., dates between which it is valid, a record of general flying experience, accidents, date of last medical examination, and the types of aircraft for which he is licensed to fly. The Pilots' Record Book may be inspected by any person interested, on application to the Secretary of Lloyd's Aviation Record, Lloyd's, Royal Exchange, London, E.C.3.

New Zealand Island Flight

FROM the High Commissioner for New Zealand the information is announced that the first aeroplane flight from the South Island of New Zealand to Stewart Island has been successfully accomplished.

"(a) The design and primary standard of construction of the aircraft.

"(b) The condition of the aircraft when setting out for the flight.

"(c) The nature of the flight and the proposed load.

"(d) The skill and experience of the pilot, particularly with regard to the particular journey undertaken.

"(e) The meteorological conditions at the time of the journey.

"Of these factors the second is that which concerns the ground engineer. It may often, therefore, be his duty not only to maintain that minimum standard insisted upon by his supervisors, but a higher standard which may be laid down by his employers, by the reputation for which they may obtain advantageous insurance terms.

"(6) It is suggested that it may be found necessary to consider the formation of a superior grade of ground engineer. It is already probable that a large operating company would find it desirable to place their ground engineers under the control of one man who had higher technical qualifications and ability than are required for the ordinary ground engineer. Such a man would go far towards ensuring the reliability of any service and would advance the status of 'ground engineering' nearer to that which must be attained if these men are to safeguard adequately the aerial transport of the future."

In two appendices the lecturer gave a list of "Notices to Ground Engineers" (which have been published in *FLIGHT*), and results of examinations of ground engineers, which showed that out a total of 664 applicants, 509 were passed and licensed up to December 31, 1920, of which 26 per cent. were operating and under supervision during 1920.

France and the Air-Budget

FOR 1921 a good round sum is being asked for by the aviation departments of our Ally, totalling to over 527 millions of francs. The Minister for War asks for 287,312,670 francs; the Minister of Marine, 50,553,300 francs for home purposes, Algeria, Tunis and Morocco. For the Colonies, 4,805,405 francs are required, and the new Under-Secretary for Aviation puts his amount at 184,683,270 francs. Of the total sum asked for, material for works, laboratories, etc., absorb 454,275,995 francs and 33,215,000 francs are allotted to prizes and subsidies. Petrol for military and service purposes would be in addition to these requirements.

The Aé.C.F. Grand Prix

FEBRUARY 20, 21 and 22 is the first three-day period when competitors may go for the prizes offered by Mme. Deutsch de la Meurthe, through the French Aero Club. Particulars of the competition were given in *FLIGHT* on January 14 last.

The course is about 2,400 kiloms., and to fly this within twenty-four hours will necessitate day and night flying, for which lighting provision has been made at the various turning points of the air-route mapped out. A maximum time of seventy-two hours to cover the distance is allowed to each competitor from the time of starting, and five starts are permitted each competitor during the three-day periods. It is not very likely that the February dates will bring out many contestants, so that it will not be until the May three-day period that a show may be expected.

Damblanc Tests His Screws

SOME recent tests by M. Damblanc at Longchamp are said to have given good results. The lift obtained, as measured on a dynamometer, is stated to be considerably greater than any previous one, and the next step will probably be the trial at Villacoublay with a full-scale machine, carrying a dummy to represent the pilot. This machine may be released from a balloon.

American Non-Stop Duration Record

It is announced from San Diego that a new American record for pilot and five passengers for seaplanes has been put up by the U.S. naval seaplane "N.C.5," which flew on January 1 from San Diego to Magdalena Bay, Lower California, in 9 hours 15 mins. The distance between Point Loma and the bay is 702 miles.

An Indian Air Mail Adventure

ON January 19, Flying-Officer Cyril Richard Smythe, in charge of a Bristol fighter, carrying the Indian mails, lost his way on the Indian frontier, and had to make a forced landing in Afghan territory, owing to petrol shortage. Neither the pilot nor the observer were injured, and news has since been received that they arrived safely at Kabul on January 26.

THE ROYAL AIR FORCE

London Gazette, February 1
Reseconding.—The name of Flying Offr. Richard Vaughan Bramwell-Davis (Lieut., R.F.A.) is as now described, and not as *Gazette*, April 27, 1920).

Flying Branch

Pilot Offr. J. L. FitzR. Creighton to be Flying Offr.; Dec. 28, 1919. Capt. K. B. S. Greig to be actg. Maj. whilst empd. as Maj. (K.B.); from Oct. 30, 1918, to April 30, 1919. Lieut. (actg. Capt.) J. S. Williams, M.C., to be actg. Maj. whilst empd. as a Maj. (A.); from July 1, 1918, to April 30, 1919 (substituted for *Gazette*, Aug. 27, 1918). Sec. Lieut. (Hon. Capt.) J. S. Paton relinquishes his temp. commn. on appt. to T.F. Reserve, and is permitted to retain the rank of Capt. Sec. Lieut. D. W. Giles relinquishes his temp. commn. Lieut. C. Reece relinquishes his temp. commn. on ceasing to be empd.; March 22, 1919.

Transferred to the Unemployed List.—Lieut. (Hon. Capt.) D. A. Sutcliffe; Jan. 18, 1919. Lieut. J. M. Vennell; July 13, 1919. Lieut. A. W. Robinson; Sept. 16, 1919. Lieut. P. V. Holder; April 14, 1920 (substituted for *Gazette*, May 7, 1920). *Gazette*, March 28, 1919, relating to Sec. Lieut. C. E. Jones is cancelled, *Gazette* April 4, 1919, stands). *Gazette*, Sept. 24, 1918, relating to Flight Cadet J. C. C. Lovelace is cancelled.

Administrative Branch

Pilot Offr. W. J. Barker to be Flying Offr.; Oct. 25, 1919 (since demobilised). Lieut. W. M. Long is transfd. to the Unemployed List; May 20, 1919 (substituted for *Gazette*, July 22, 1919). Notifications in *Gazettes* of Nov. 7, 1919, and Jan. 6, 1920, relating to Lieut. John Woolfenden are cancelled (*Gazette*, Nov. 28, 1919, to stand).

Technical Branch

Lieut. A. F. Perry is transfd. to the Unemployed List; Aug. 8, 1919.

Medical Branch

Capt. J. J. O'Mullane is transfd. to Unemployed List; Jan. 3.

Memoranda

Four Cadets are granted hon. commns. as Sec. Lieuts., with effect from date of their demobilisation. Hon. Sec. Lieut. N. M. French relinquishes his hon. commn. on appt. to T.F.

London Gazette, February 4

Permanent Commissions

Flying Offr. L. F. Pendred, D.F.C., is granted a permanent commn., retaining his present rank and sen.; Oct. 24, 1919 (*Gazette* of that date, appointing him to a short service commn., is cancelled). Sqdn. Leader L. T. N. Gould, M.C., is restored to the Active List; Jan. 26. Sqdn. Leader E. L. Miller, M.B.E., relinquishes his permanent commn. on account of ill-health contracted in the Service, and is permitted to retain the rank of Maj.; Jan. 29.

Stores Branch

The following are granted permanent commns. for Accountant duties, in the ranks stated, with effect from the dates indicated:—

Flight Lieut.—T. C. Miller, M.C.; Jan. 15.

Flying Officers.—P. J. Farmer; Jan. 15. R. Byrne, M.C.; Jan. 29.

Short Service Commissions

Flying Offr. J. Holthouse resigns his short service commn., and is permitted to retain the rank of Lieut.; Jan. 23.

The following Flying Offrs. are transfd. to the Res., Cl. B.—H. J. Lucas; Jan. 21. J. Sewell; Feb. 5.

Stores Branch

Flying Offr. H. J. Thomas is granted a short service commn., retaining his present rank and sen.; June 17, 1920 (for three years on the Active List).

The following are granted short service commns. for Accountant duties, in the ranks stated, with effect from Jan. 15:—

Flying Officers.—H. G. Bushell; R. H. Cleverly.

Medical Branch

The following are granted short service commns. as Flight Lieuts., retaining their present sen., with effect from Feb. 4.—S. E. Duff, M.B., C. McC. Jones, M.A. Flight Lieut. R. Mugliston resigns his short service commn., and is permitted to retain the rank of Capt.; Feb. 2.

Flying Branch

The following relinquish their temp. commns. on return to Army duty.—Lieut. J. Fitzgerald (Lieut., I.A.R.O.); May 26, 1919. Lieut. G. Veevers-Carter (Lieut., King Edward's Horse); May 30, 1919 (*Gazette* of Oct. 26, 1920, to stand).

Administrative Branch

Capt. J. M. Pye-Smith relinquishes his temp. commn. on appt. to T.F. Reserve, and is permitted to retain his rank. Capt. A. A. Gawn relinquishes his temp. commn., and is permitted to retain his rank; Oct. 10, 1919.

Stores Branch

The following are granted temp. commns. for Accountant duties in the ranks stated, with effect from the dates indicated:—

Flying Officers.—A. B. Holt, E. V. Humphrey, E. C. M. Knott, H. A. Lotherington, C. N. Scott, A. D. Stonehouse, C. E. Treadgold; Jan. 15. S. A. Alexander, C. G. Riley; Jan. 27.

Pilot Officers.—J. W. Gray, F. O. Hall, M. J. Hayes, B. C. Powell; Jan. 15.

Medical Branch

F. R. Humphreys (Maj., R.A.M.C., T.F.) is granted a temp. commn. as Flight Lieut., and to be Hon. Sqdn. Leader; Jan. 31.

Memoranda

The name of 110099 Overseas Cadet Sidney Basil Howitt Esteourt is as now described, and not S. B. Escourt, as *Gazette*, June 10, 1919.

Nine Cadets are granted hon. commns. as Sec. Lieuts., with effect from the date of their demobilisation.

The seniority of all officers granted commns. in the Stores Branch for Accountant duties is provisional only. The final seniority list of all such officers will be promulgated when the establishment is completed.



Good Speed by Savoia Flying-Boat

DURING some recent tests over Lake Maggiore, a Savoia "S 12" flying-boat, designed for the Royal Italian Navy, attained a horizontal speed of about 139 m.p.h., and climbed to 13,000 ft. in 21 minutes. It is fitted with an Ansaldo (San Giorgio) engine of about 550 h.p.

The "Roma" Semi-Rigid for the U.S.

FROM the War Department, Washington, it is announced that the U.S. have acquired the Italian airship "Roma" for \$200,000 (roundabout £53,000), which seems pretty cheap for this semi rigid craft. Maj. John Thornell, with an Air Service detachment, is to take charge of the transfer to America. The "Roma" was described and illustrated in *FLIGHT* for September 30 last. It has a capacity of 1,200,000 cubic ft., and her length is 410 ft. She is driven by six 12-cylindered engines of 400 h.p. each. Her estimated speed is 80 miles an hour, and her cruising radius at full speed is 3,300 miles.

A New German Aviation Company

THE Handley Page Berlin correspondent states that the aviation company recently reported as in course of formation at Dantzig has now been registered there with a subscribed capital of 2,000,000 marks under the title of the Internationale Luftschiffahrtsgesellschaft Ileg. The company takes over the existing premises at Dantzig used by the German military authorities during the War as an aeroplane factory, and intends to build suitable flying machines for the new air services. It is said that sufficient aviation material is already available for the construction of at least thirty aeroplanes. The founders of the new venture are a factory proprietor named Lilienthal, who is connected with the Albatros-gesellschaft, and a Dr. Donski, an engineer. The new company claims to have secured a contract from the Polish Government for the conveyance of air mails between Dantzig-Warsaw-Cracow, and regular services between Dantzig-Posen-Cracow have already been decided upon. Mails between Dantzig and Warsaw by the ordinary methods of transport take several days, as compared with three hours by the aeroplane service now instituted. Dantzig-Lemberg is also included in the new programme.

Germany and International Air-Traffic

A STATEMENT has been published in the *Cologne Gazette* made by Herr Colsmann, who for many years was a co-worker with Count Zeppelin. In this Herr Colsmann deals with the future of the Zeppelin aircraft and says:—Zeppelin traffic for Germany alone is not to be thought of, especially on account of the cost and because the Peace Treaty ties our hands. Air traffic can therefore only be international, with international capital. As regards the building of separate Zeppelins, Germany up to now has been in the first position. The Entente countries still lack knowledge of the method of construction. They have not our trained workers, our long experience in construction.

Should Germany let her achievements rust, because she can make no use of it, or give her knowledge to the world in general? Herr Colsmann believes that the latter is the better plan and states that the company has decided to offer the German Zeppelin as a means of traffic, to other countries. Negotiations are in progress with a French firm, but so far no tangible results are forthcoming.

New Zealand Air Mail and the United States System

FROM New York comes the news that New Zealand is, according to J. B. Murphy, of Timarou, to establish aeroplane mail routes along the lines already proved to be practical by the United States Post Office Department. Mr. Murphy is interested in an aircraft operating company in Timarou, one of the big cities of South Island, New Zealand. He has been visiting New York for a demonstration of the ten-passenger Liberty-engined Curtiss "Eagle," with a view to utilising it in a tourist sight-seeing service over Mount Cook, which is the great objective point of tourists in New Zealand. He is, he states, already carrying passengers around the 13,000-ft. peak in smaller machines, supplied to his company by the New Zealand Government. The Government is also encouraging civilian aeronautics by establishing landing-fields. Mr. Murphy's company proposes to operate from Timarou between the cities of Christchurch, Dunedin and Invercargill, 400 miles in one direction and 100 miles in another. He has a contract to carry the air-mails.

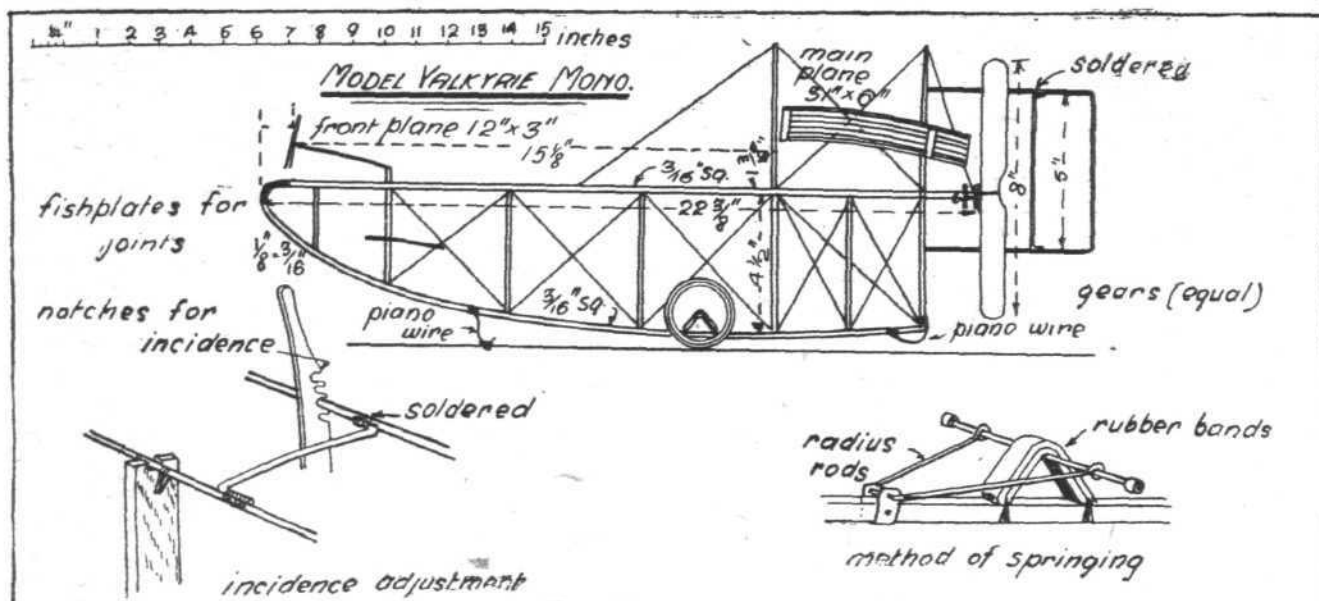
Models

NOTE.—All communications should be addressed to the Model Editor. A stamp should be enclosed for a postal reply.

The Valkyrie Type

My other drawings show details of a model Valkyrie monoplane, a type now obsolete as far as full-size machines go, but an extremely pleasing one to model. The elevator fastening and adjustment are shown in detail. The trailing edge is held down in a notch in the wooden uprights by

centre of gravity of the machine if it is preferred to make the main-plane a permanent fixture. I personally prefer to test the model without the weight, find the correct position of the main-plane, and then fix the weight on the c.g., effecting any subsequent adjustment to the elevation by means of the weight. The main-plane fixture is shown by Fig. 2, and consists of wire



fine iron wire or thread, passing through a small hole, whilst in front a brass quadrant with slots in the front edge is lashed to the top members of the framework of the machine, the wire of the elevator being held in the required notch by its springiness. The fabric covering is not shown in any of these sketches. If it is intended to use four wheels, as in the prototype, two each side carried on short axles, I show an arrangement by which this may be accomplished by means of rubber suspension and radius rods. These latter are formed of one piece of wire passing through a tinplate bent around and bradded to the skid. The ends of the wire are bent around the steel wire and soldered there. After slipping the wheels over the ends of the axle, some short pieces of brass tubing are pushed on and soldered in place to form collars to prevent the wheels coming off.

Excellent suspension wings may be made by cutting short lengths off a piece of india-rubber tubing of sufficiently large diameter.

The Weight Lifting Monoplane

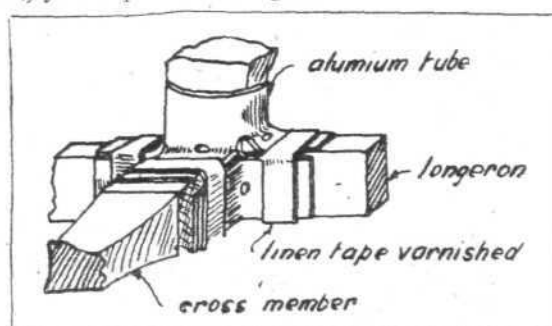
Two details of construction only need be dealt with—the attachment of the lead deadweight and the main-plane attachment. The former (Fig. 1) consists of a lead casting of streamline form equal in weight to one quarter of the total weight of the model. It is suspended to the model by means of piano wire, the end of which is doubled back to form a spring so that it fits snugly into a hole drilled in each end of the lead weight. This weight can be made to adjust the

crutches bent and soldered to saddle the spar; lugs bound and soldered to extensions of the leading and trailing edges of the two halves of the wings fit over the wire extensions, and are held thereon by means of the bracing wires.

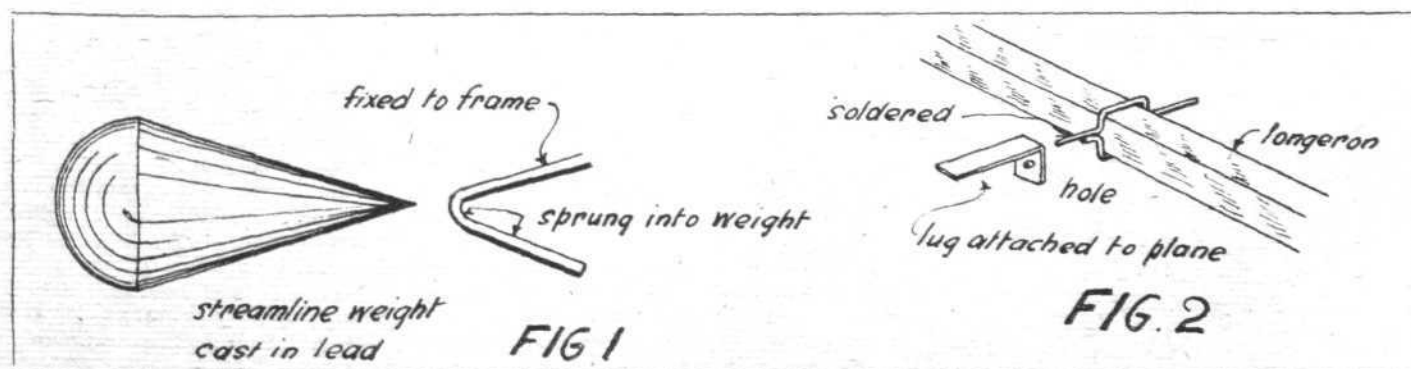
Replies to Correspondents

D. A. (Vancouver).—The money order was duly received by me, forwarded to and acknowledged by Mr. Groves. I have also forwarded your letter to him.

W. B. (Vancouver).—The appended sketch shows the type of fitting you require for the glider.



E. G.M. (Sutton).—You will note that a recent paragraph dealt with one portion of your query; the remainder I replied to direct.



LEGAL INTELLIGENCE

Seaplane and Aeroplane's Share in Prize Bounty

THIS was a motion in the Prize Court on January 2, on behalf of Capt. John Robin Allen, lately in the Royal Air Force, and Flight Officer Colin Peter Brown, D.F.C., R.A.F., for a declaration that they were entitled to share in the award of prize bounty, amounting to £160, which had already been made by the Court in favour of H.M. seaplane 8695 for the destruction of the German submarine U.C.72.

Mr. J. A. Stainton, who appeared for the applicants, read an affidavit which had been sworn by Capt. Allen, from which it appeared that on September 22, 1917, the aeroplanes B.1821 and B.1819, of which Mr. Brown and he were pilots, were under orders to escort the seaplane 8695 while she was patrolling in search of enemy submarines between Dunkirk, Dover and Ostend, and were following and protecting the seaplane (which, as compared with an aeroplane, was unwieldy, slow and a large target), when she sank the U.C.72.

Mr. Wilfrid Lewis and Mr. Ronald Walker, who appeared for the crew of the seaplane and H.M. Procurator-General, assented to the motion.

The President, in granting the motion, said that the aeroplanes were protecting the seaplane, and their presence was a necessary part of the success of the operation. The crew of the seaplane were quite willing that the fund should be shared by the applicants, and he only regretted that the fund was not larger.

SIDE-WINDS

It is pleasant to put on record in these columns a photograph of Mr. G. A. Parsons, who has recently been appointed general manager of the Palmer Tyre, Ltd., in succession to Mr. E. J. Mitchell. Mr. Parsons joined the Palmer Tyre organisation as manager of the Motor Tyre Department in January, 1904, and has been responsible for the sales control of Palmer Cord motor tyre right from its inception to the present day. He was made joint general manager in May, 1919.

Genius has been defined as an infinite capacity for taking pains, and at no period was genius in organisation better exemplified than during the progress of the War. Mr. Parsons was responsible for the management of the whole of the aeroplane wheel and tyre branch of the Palmer business, and some idea of the magnitude of the operations will be



realised when it is on record that Palmer landing wheels and tyres were fitted to every fighting and bombing aeroplane that left Great Britain during the War. Up to the end of the campaign Palmer aeroplane wheel and tyre output was always ahead of the combined requirements of the R.A.F. in the field and the constructors at home, leaving a very useful margin at the disposal of our Allies in the various fields of War. From this it will be seen that Mr. Parsons brings to his new position a ripe judgment and an experience gained in the practical world of doing things, and we congratulate both Mr. Parsons on his appointment and the Company on its selection.

THE Sunbeam Motor-Car Co., Ltd., announce that it is quite impossible at the present time to offer their cars at any lower prices than those stated in their current catalogue; yet in order to encourage sales, they will be pleased to refund to those purchasing now, and up to June 30 next, any difference between present prices and prices ruling then, should it be found possible to effect any reduction during the next few months. In the event of this being the case, a refund will be made at once upon application being made by the purchaser before July 31, 1921.

NEW COMPANY REGISTERED

HANDASYDE AIRCRAFT CO., LTD., 1, Laurence Pountney Hill, E.C.—Capital £100, in £1 shares. Aeroplane manufacturers, aeronautical engineers, etc. First Directors.—G. H. Handasyde and H. Fulton,

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1917

Published February 10, 1921

- 8,386. G. HERVIEU and P. M. G. MARECHAL. Airship, etc., sheds. (156,815.)
16,855. J. H. HAMMOND. Automatic and distant control of aircraft. (156,818.)

APPLIED FOR IN 1919

Published February 3, 1921

- 25,547. H. N. WYLIE. Tubular members for aeroplane struts, etc. (156,354.)
26,902. M. E. DARE. Control of aeroplanes. (156,366.)
27,810. J. BETHENOD. Apparatus for equalising compression of aircraft engines when flying at various altitudes. (156,390.)
30,928. BOULTON AND PAUL, LTD., and J. D. NORTH. Aeroplane wings. (156,395.)

APPLIED FOR IN 1920

Published February 10, 1921

- 2,371. H. E. S. HOLT. Parachute flares. (156,822.)
22,512. H. BOLAS. Means for folding planes of aircraft. (156,858.)
22,512. H. BOLAS. Aileron and elevator control. (156,859.)
22,514. H. BOLAS. Alighting gear. (156,860.)
22,585. A. BLUMH. I.C. engines with stationary cylinders around central driving-shaft. (156,861.)
25,093. J. M. WALLWYN. Air-cooled I.C. engines. (156,901.)
27,955. HOLT MANUFACTURING CO. Aeroplane landing-gear capable of being driven. (156,960.)

APPLIED FOR IN 1920

Published February 3, 1921

- 5,421. SPERRY GYROSCOPE CO. Gyro-compasses. (139,474.)
10,207. L. DE MONTGRAND. Rotary engines. (145,000.)
14,522. DAIMLER MOTOREN GES. Mounting of aircraft engines. (143,896.)

APPLIED FOR IN 1921

Published February 10, 1921

- 5,639. E. and H. BERLINER. Detachable wheels. (157,002.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xiii and xiv).

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The Aircraft Engineer and Airships

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